RAILROAD GAZETTE

FRIDAY, MAY 3.

CONTENTS.

ILLUSTRATIONS:	PAGE.
The Compound Locomotive "Pennsylvania"	288
Highway Bridges — Nova Scotia	290
Kitson's Cushioned Wheel	291
A New Stud Wrench	293
The Non-Pressure Car Heater	293
CONTRIBUTIONS:	
Rail Joints	287
Train Resistance and Track	287
Standard Couplers	287
State Control of Technical Features of Railroad Management	287
What is Uniform Classification?	288
Canadian Competition	288
EDITORIALS:	
Standard Couplers	294
Principles Involved in Passenger Rates	295
State Control in Technical Matters	295
EDITORIALS:	
Train Accidents	296
Red Tape	296
EDITORIAL NOTES	294, 297
TRADE CATALOGUES	297
GENERAL RAILROAD NEWS:	
Meetings and Announcements	300
Personal	300
Elections and Appointments	300
Old and New Roads	301
Traffic and Earnings	302
MISCELLANEOUS:	
Technical	298
Railroad Law	299
The Scrap Heap	299
An Electric Railroad for London	289
Stone Ballast in India	292
Train Accidents in March	297
A French Vestibule Car	298

Contributions.

Rail Joints.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read your résumé of the rail joint matter in your issue of the 26th inst. The conclusions therein presented seem so well defined and so comforting that it would be almost a pity to disturb them; but when you refer so encouragingly to the use of the 6-bolt splice, and say that breakages have practically ceased, I am not quite able to take it all in. I have now on my desk reports showing something over 2,000 of them broken on one great line.

When you refer to the 3-tie supported joint as so promising, I fall short again and sit back in a sort of stolid incredulity. The fact is I cannot take much interest in any structure so unmechanical as the angle splice, whether it be four or six bolt. But I am not going to quarrel with you or with any one else about it. There is no use in argument in matters of faith. The other fellow always thinks that you differ with him because there is something wrong with your mind or morals; and belief in the angle splice has come to be a precious article of faith with a great many engineers and some editors. I have no notion of being excommunicated or otherwise suffering the pains of heterodoxy, but, like Brer Rabbit, I kinder chuckle in my stummick and ain't sayin' nuffin, for I see that the loads are now so heavy and the punishment so severe that within a year or two the truth about the angle splice will come out in spite of the priests and the prophets. P.

Train Resistance and Track.

LONDON, March 30, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It is argued with very considerable show of reason that a main cause of train resistance, especially of the engine resistance, is due to the yielding of the track. Theoretically, on the basis of perfect elasticity, an elastic rail will exert just as much propelling effect on every wheel as it exerts a retarding effect upon its advance. Every wheel performs work by forcing the rail into a position below its normal level, and were the track absolutely elastic the work absorbed would be given out again behind the wheel. As a fact, however, track is not elastic, and such elasticity as it possesses has a certain co-efficient of delay, to use a somewhat new phrase. By this I would be understood to mean that the power of the track to return to the level at which it stood before passage of a wheel is delayed; the return is to some extent sluggish, and at high speeds it may very well happen that the return spring of a rail will occur just in front of the next following wheel in such a manner as to exert a specially retarding influence upon it. If a rail surface could be secured perfectly even and level, then the best possible track would be one laid with long rails, on a continuous steel sleeper, well bedded on a concrete base. Practical considerations have led to our present type of cross-tied roads, wherein a rail or a chair is placed on a series of more or less soft and yielding timbers, and these again upon a foundation of earth or stone more or less liable to be crushed and displaced by pressure. Apart from the actual bending of rails between ties it is pretty certain that most of the deflection of a well-ballasted track is due to the sinking of the rail into the tie and to the actual bodily compression of the tie beneath the load, and it is rapidly becoming a question of first importance whether a first-class track should not be wholly of steel, timber being entirely discarded. The longitudinal timber bearing for rails, as used on the Great Western Railway, England, has been noted for the even, pleasant motion which it afforded, and there is no reason to doubt its superiority in many respects over the system of cross ties.

One of the objections to a longitudinal sleeper is the difficulty of drainage of the ballast between the rails. Another objection is the tendency of the rail and sleeper to cant bodily over sideways, owing to the great elevation of the rail above the base of the sleeper. With metallic sleepers this difficulty is easily overcome, and half a dozen different forms of longitudinal rail support will at once suggest themselves as affording a rail whose head need not be above 6 in. higher than the ballast if thought necessary. Nor do I think that in an entirely metallic track there would be found any necessity for inserting so-called elastic materials between the rail and sleeper. The perfect circularity of wheels should be sufficient on a level rail to obviate the necessity for any further elasticity of vehicle than that provided by the bearing springs; and given a well-laid track, the points to be attended to to prevent unevenness are those connected with and dependent upon the more or less perfect continuity of the supporting pressure.

A discontinuous rail can never be supported evenly even by the best of fish plates, combined with closer spacing of ties at and near the joint. A later English method of rail joint is to combine fish plates and bearing chair, the rail joint being not merely fished, but the fish plate as well as rail being securely bolted to a special joint chair, so that the joint is not suspended as heretofore between two more closely spaced ties. With continuous sleepers the problem of rail support seems to be capable of even a better condition, the loss of the supporting power of the rail being recoverable by an addition to that of the supporting sleeper.

The chief difficulty in fishing a rail joint to equal the solid rail lies in the fact that no substitute is made for the power to resist compression, as the upper member of a short girder, which is afforded by the rail head. Fish plates substitute for a girder, merely a girder without a top flange, but with a greatly thickened web. The shear resistance is, perhaps, increased, but the bending resistance is reduced. Hence the ties are spaced more closely, so that the deflection of the rail ends may not exceed that of an ordinary spacing. Each rail end partakes partially of the nature of a cantilever, whereas other parts of the rail are in the position of continuous girders, and as such the spacing of ties should become closer toward the ends of the rail, and not merely just at the rail joints. The Midland Railway of England carry out this approximately, each rail being supported by ties of three or four different spacings.

The vast distances to be traveled in America call for a more rapid transit than anything hitherto accomplished, and seem to point to a special transcontinental line, of expensive construction, for fast traffic alone. The increase of population will, alone, render this project feasible, and should it be undertaken it would seem proper that the track employed should embody the principle of continuous support to an extent and nicety hitherto never attempted, if even dreamt of. An absolutely unyielding rail run upon by circular wheels would give a minimum of resistance and render possible speeds, even with present locomotives, not possible under the present condition of track whereon train resistances seriously increase with velocity. B.

Standard Couplers.

CHICAGO, April 27, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In view of the probability of the Inter-state Commerce Commission taking some early action on the question of uniform or automatic couplers, as indicated by a circular recently issued by them to the railroads in this country, it seems desirable that the subject should be further considered with a view of preventing that Commission, if possible, from repeating the errors into which the several state commissions have fallen. There has never been, and is not at this time, so much necessity for an automatic coupler as for uniformity in the size, shape and height of the coupler. The poorest form of coupler now in use, if applied to all the cars in the country and placed at a standard height, would do more to solve the main point, *i. e.*, safety, than all that has been accomplished in the improvement of link couplers, and the adoption of the automatic coupler by all the railroads and commissions.

The action of the several state commissions on this subject has been brought about by public clamor, produced mainly by the agitation of the subject by the inventors of so-called automatic couplers for their own benefit, and this public clamor in several instances caused the state commissions "to rush in where angels fear to tread," and not wishing to incur the responsibility for the adoption of a uniform single standard each commission prescribed several forms which might be used—the different states prescribing different kinds—and of the whole number so prescribed, the greater portion do not couple interchangeably with the others. This action by the commissions of the several states showed conclusively that there did not at that time exist an automatic coupler which had demonstrated its claim to superiority to such a degree as to admit of absolute uniformity being attained; and had all of the states prescribed automatic couplers in the same manner, and had the laws been rigidly enforced, the danger would have been increased a hundred fold and the transportation business of the country seriously crippled.

The adoption of the standard height of drawbar is equally a necessity whether the link or vertical plane coupler is used, and is a vital element to be considered in providing for safety, and is a question that must be acted upon and determined before the safety point is reached, no matter what coupler is used. At no time in the future can this be determined more accurately or with greater economy than now. The standard of height having been agreed upon, the next step should be in the direction of uniformity, and to attain this some one non-automatic coupler and some one form or shape of automatic coupler should be prescribed and a reasonable time given to all the railroad companies to change their equipment to either form. If this were done and the parties above mentioned were left to determine the question, I am of the opinion that the recent action of the Master Car-Builders' Association, making the Janney type the standard of automatic couplers, would remain unchanged, at least for the present. The main question would then be on the selection of a uniform, safe and economical (both as to first cost and repairs) common link coupler. On the score of safety I am satisfied that the Perry, Marks, Safford or other coupler of about their form, would receive an overwhelming majority in approval from that class of railroad employés to whom safety is the great and only consideration, while from the railroad officers it must also receive like support on the grounds of economy and efficiency.

If this degree of uniformity existed to-day, *i. e.*, standard height, one standard of non-automatic and one standard of automatic couplers, 90 per cent. of the present danger would be removed. The percentage of danger would then increase in the proportion that the automatic was substituted for the non-automatic until the number of each became equal, when it would again decrease. That there will ever be a time when there will be absolutely no accidents from coupling cars, I do not believe, even though the coupler reach the acme of perfection.

There is one point in this coupler question which I have not seen clearly stated in print, and that is that the claims of the vertical plane do not rest solely upon its automatic action. If this coupler ever becomes the sole standard in use it will be because it secures close coupling, which is considered essential to the safe and economical handling of trains equipped with power brakes, and not because it is an automatic coupler.

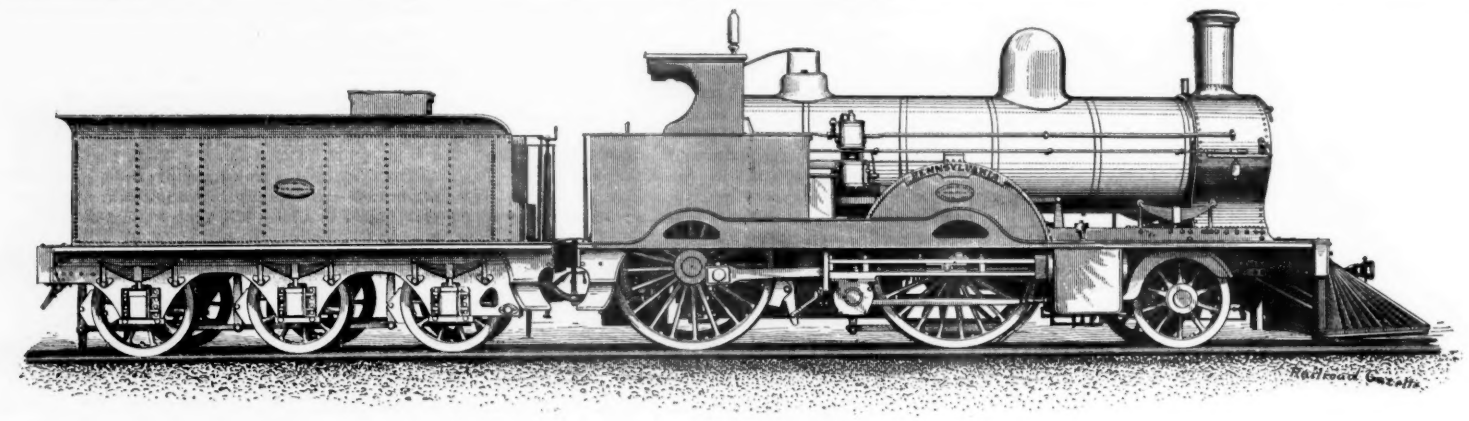
The Miller and Janney couplers did not come into universal use in the passenger service because of their being automatic, and the success of the Janney coupler in the passenger service cannot be admitted as determining their adaptability in freight service. If the introduction of the Janney type coupler is to be dependent on the introduction of power brakes to freight cars it will of necessity require a good many years; and it will be several years before any automatic coupler becomes universal no matter what pressure may be brought to bear to compel it. Give us immediately a standard height and a standard non-automatic coupler, to be selected by the parties interested, thus securing the greatest degree of safety, efficiency and economy, and leave the automatic question to the Master Car Builders Association and the survival of the fittest. X.

State Control of Technical Features of Railroad Management.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with much interest the letter of Mr. Cooley in the *Railroad Gazette* of April 26 and your editorial note thereon. The subject of uniform brakes and couplers for freight trains is certainly important, and it is a matter for congratulation that a person who understands the bearings of the problem so well as this writer does is taking an interest in it. State legislation is constantly hampered, and we see that state commissioners are taking up this subject in a very gingerly manner. The Massachusetts commissioners, to whom you refer, seem to be trying to do all in their power to promote progress in this important matter, but it is up-hill work. Chairman Crocker has placed before Congress, both directly and through his influence with other state commissioners and legislatures, ample information in the shape of memorials and drafts of bills, but nothing seems to be done. He also took an active part, as is well known, in the conference of commissioners at Washington last month, but this is all of little value; a conference once a year of a body which works together with none too much facility will not start any reform with much celerity.

While the difficulties of carrying out Mr. Cooley's suggestions are indeed great, it seems to me that in your criticism on his statements you have given the public very little aid and comfort in its desire to get something done. You discuss the arguments pro and con. at length and then stop. You leave us in just the same position that the reader finds himself after reading a chapter or two of one of Mark Twain's exciting romances. After he gets his heroes and heroines into most embarrassing predicaments, Twain coolly informs the reader that if he chooses to extricate those people from their difficulties he is free to do so; as for him—Twain—he gives it up. You say that the railroads must have higher rates or they cannot provide safe appliances for their men. If rates continue at their present level, the roads simply fall back and say they will do nothing. Are we here stuck in the final slough of despond? Must the legislatures allow the railroads to go on piling up money for use in fighting each other or building new branches into unproductive country, and have no assurance that they will look after the safety of their men? From past experience it seems that railroad officers will extend their roads, try experiments in favoring certain kinds of traffic and thus make some show of using their money for the benefit of the public, and will even increase the accommodations to the public in the way of furnishing elegant cars and imposing station buildings; but such simple matters as providing for the safety of trains and men, or improving the plant in any direction which will not make an outward show and afford the officers an opportunity to exercise their vanity, have to wait until the more pleasing ways of spending money have been exhausted. Even where the protection of lives and limbs of the men comes in as secondary, the chief object of the expenditure being the furtherance of some merely technical question, new enterprises and reforms are made to wait and come behind others which have no connection whatever with humanitarian purposes. If $10,000 would provide guard timbers for bridges, or additional in-



THE COMPOUND LOCOMOTIVE "PENNSYLVANIA."

spectors and mechanics to enhance the safety of freight brakemen by more careful attention to inspection and repairs of ladders, brake wheels, grab irons, etc., on freight cars, even so laudable a purpose as this would have to be deferred if the president or general manager happened to want that sum to put himself on a social level with some other president or general manager who happened to have a finer private car than he.

Surely it is reasonable for a state or for Congress to correct such mismanagement as this. When railroad directors allow themselves to become narrow-minded and to forget their duty to spend for the benefit of their employés some of the money which is naturally squandered on luxuries or foolishness it is high time that some power step in and interfere. The Western idea is that the railroads have ground down, or at least assisted in impoverishing, the people; now let the people retaliate, and if the retaliation seem a little strong, no matter; things will not be more than fairly evened up. This notion is not wholly bad, and I advocate a mild application of Mr. Cooley's medicine. Let us see how it works. C. B. H.

What is Uniform Classification?

TO THE EDITOR OF THE RAILROAD GAZETTE:

The convention of Inter-state and State Commissioners held in Washington two months ago adopted a resolution favoring at least an approach towards uniform classification of freight. It is probable that the mercantile community will in the future take a much more decided interest in this question. As long as the discussion embraces mere theory, the average business-man pays little attention, but let the theory crystallize into practice affecting his trade and he is aroused at once.

What does uniform classification mean? Nobody knows; and no definition has been made public. Does it mean that the special product of a certain section, carried in that section at special rates, shall fix the classification for the local shipments of that article in other sections? If so, it manifestly follows that the rate on this article must either be put up in its own home section or down for the ordinary shipment. In either case a wrong is done to owners and carriers alike and the accepted principle of "value of service" is violated. Does it mean that the classification of products made necessary by competition and possible by quantity and regularity of shipment in one part of our country, shall rule everywhere? that the consideration to the flour traffic shown by the Minneapolis roads shall be compulsory in the sparsely settled South?

The relation between raw material and manufactures varies in different states according to growth in manufacturing. This variety of need and consequent possibility of higher railroad charges on some roads than others, how shall these be expressed if a dead uniformity of relationship is insisted upon everywhere? Manifestly many articles could easily be changed a class or two, and thus brought into uniformity in the Official and the Western without much disturbance of trade; but the articles of staple character and of narrowest margin of profits are the ones now often found furthest apart, and also the ones whose present classification is in the different sections most insisted upon.

Shall we allow exceptional or commodity tariffs? This would solve many of the above difficulties, but would it be uniform classification? And how many of these should be allowed for the different parts of the country and on how many articles? It seems clear that to draw any line would be difficult, once we allow an exception, while with special tariffs for half the shipments in each of the different associations, it follows that a merchant or railroad clerk wishing a through rate outside of his own local area, must consult, no one knows how many exception sheets, and never be sure that he has even then seen all. A single one missed may lose the sale or the profit. The question forces itself upon us, How will the traders be any better off than now? Will the present confusion of classifications be the least reduced? And yet without something of the kind, we shall have a uniformity which will prove death to trade.

The mercantile public would like to know just what our State and Inter-state Commerce Commissioners mean by "uniform classification" before we go any further. What do railroad officers understand by the term?

A straw, showing the direction of the wind among railroad men, as well as shippers, appears in the following from a Louisville paper:

"Among Louisville freight men the opinion is freely expressed that the Central Traffic Association is going a little too far, and bordering on crankiness. Chairman Blanchard now proposes to do away with all commodity rates, and his action is the cause of the latest howl. A general freight agent says: If the Central Traffic Association intends to crowd shippers till they rise in a body against all associations, demanding special legislation against such organizations, they are going at a rapid rate in that direction. There are classes of freight carried on commodity rates which will never be moved on a sixth-class rate or any other classification that makes a higher rate than those given under the commodity tariff. The advance would be an extremely unjust one, and, in the opinion of many freight men, would be a very injudicious move." JUDEX.

Canadian Competition.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The United States Senate Committee on Inter-state Commerce, of which Senator Cullom, of Illinois, is chairman, were directed by the Senate to investigate the relations between Canadian and American carriers, both rail and water, and "to represent what legislation, if any, is necessary for the protection of the commercial interests of the United States" or to enforce the act to regulate commerce. The committee will hold sessions in New York City, beginning May 3, and visit the principal centres of trade, both east and west, collecting all the testimony and evidence possible upon the subject of Canadian competition. The problem is one of great difficulty. Beginning with Gen. J. H. Wilson's address, a year ago, there has been growing a feeling, carefully fostered by certain railroad interests, that the Grand Trunk and Canadian Pacific have by various means (often illegitimate) diverted the traffic belonging to our own lines; that this is directly contrary to our industrial and public policy and that exclusion of Canadian roads from American trade is the only remedy.

It cannot be denied that public sentiment is settled in condemnation of certain practices connected with this "Canadian question." While carrying our ordinary merchandise through Canada, the Dominion authorities refuse to allow one kind—fish—to be transported in bond through that country. For my part, I yield to no one in condemning this. It is also claimed that these Canadian roads charge in Canada such high local rates as to support them, while offering cut rates on American traffic, these latter being lower than the American roads can quote, since the inter-state law forbids high local and low through rates. It is hoped that the present committee will ascertain exactly how far this charge is true. The matter is complicated by the subsidies given the Canadian Pacific, which are used to help that road along while underbidding American roads, though the Grand Trunk has no subsidy.

The Vanderbilt roads are reported as strongly in favor of exclusion. The plan is said to include the building of a connecting line from about Ann Arbor, Mich., to Toledo as an outlet for the Michigan Central. The lease of the Canada Southern is on a percentage of earnings, so that that loss could be easily carried. Altogether the gain to the Vanderbilt system by shutting out the Grand Trunk would far outweigh any possible disadvantage. But Detroit would suffer greatly; indeed an arbitrary between Toledo and Detroit might be the outcome. This brings me to the very serious fact that more American interests would be hurt by excluding Canadian competition than benefited by it. The Central Vermont would be ruined by the stoppage of transit through Canada; the city of Portland, Me., would pay an arbitrary to and from Bostor, and in both Portland and Detroit real estate would be worth something less than 100 cents on the dollar. Chicago has already served notice on Senator Cullom that it will hold him responsible if there is any interruption of traffic through Canada; Minneapolis and St. Paul are up in arms about it; half the trunk lines have valuable connections through Canada, and their traffic would go to other carriers; and so on through a long list.

Public sentiment will never allow the injustice of suddenly breaking off commercial relations which are the growth of years and upon the continuance of which millions of our own money depend. What shall we do then? For a final answer we must wait for the facts to be brought out by this Senate Committee. But it seems plain that the questions involved should be separated. Fishery injustice should not compel injustice to cities and carriers not concerned in it. Two wrongs do not make a right. Nowhere have I noticed any condemnation of the American connections of the Canadian roads for accepting a pro rata share of these low rates. And as for the fact that these are "foreign" roads which compete with ours, it is to be remembered that half our own railroads are owned abroad. Still, justice should be done to American carriers. How to do this without destroying more than we save, is the problem before Senator Cullom's committee. G.

The "Pennsylvania" Compound Locomotive.

The compound locomotive Pennsylvania has already been described in considerable detail in these columns, but the engraving which we publish in this issue and the following list of general dimensions will give a more accurate idea of the engine than anything yet published. In fact no picture of this locomotive has yet appeared in print. That which has recently been published by several of our contemporaries was made from another of the type, with only the name changed. Several differences in minor details will be seen on comparison of the pictures. The one which we give here is made from a photograph of the "Pennsylvania" taken at Altoona. The following dimensions and memoranda were taken directly from the engine and from the data at the shops.

Gauge	4 ft. 9 in.
Number of pairs driving wheels	2
Diameter of driving wheels	75 in.
Wheel centres	Cast steel.
Tires	Steel.
Total wheel base (engine and tender)	37 ft. 9 in.
Total engine wheel base	18 ft. 1 in.
Length of rigid wheel base	9 ft. 8 in.
Diameter 1st driving axle bearings	7 in.
" 2d " "	7 in.
Length 1st " "	13½ in.
" 2d " "	13½ in.
Diameter cranked axle bearing	7¾ in.
Length " "	5½ in.
Diameter crank pin bearing	4 in.
Length " "	5 in.
Number of wheels in front truck	2
Diameter " "	45 in.
Material of wheels in front truck,	Steel tired and cast steel centre.
Diameter truck axle bearing and length	6 in. × 10 in.
Type of truck	Radial axle box.
Cylinders and steam chests	1 L. P. inside, 2 H. P. outside.
Diameter H. P. cylinders	14 in.
Diameter L. P. cylinders	30 in.
Length of stroke	24 in.
Position of valve gear	Beneath guide.
Type of valve gear	Joy's.
Travel of valves (max.)	H. P., 3½ in.; L. P., 4 13-16 in.
Outside lap of valves (max.)	H. P., ⅞ in.; L. P., 1¼ in.
Lead of valves	H. P., ⅛ in.; L. P., 3-16 in.
Length of steam ports	H. P. 10 in.; L. P., 18 in.
Width " "	H. P., 1⅜ in.; L. P., 2 in.
Width of exhaust ports	H P., 2¾ in.; L. P., 4¾ in.
Kind of frames	Plate ⅞ in. steel.
Distance between centres of frames	4 ft. 1½ in.
Boiler material	Steel.
Thickness of dome sheets	⅝ in.
Thickness of barrel and outside fire-box	½ in.
Minimum internal diameter of boiler	4 ft. 1 in.
Height of stack above top of rail	12 ft. 10 in.
Width cab roof	7 ft. ¾ in.
Width over all	8 ft. 2½ in.
Length over all (engine and tender)	52 ft. 7 in.
Size exhaust nozzle	Equal to 4¾ in. round.
Pressure of steam per square inch	175 lbs.
Weight of engine, empty	91,500 lbs.
" on truck	30,730 lbs.
" on front drivers	30,670 lbs.
Weight on back drivers	30,100 lbs.
" of engine in working order	99,350 "
" on truck	32,650 "
" " first drivers	32,150 "
" " second drivers	34,550 "
Three in. water in gauge and good starting fire. Two men on engine.	
Engine fitted with driver brakes	Westinghouse automatic.
Capacity of tank	2,221 gallons.
Capacity of coal box, 3,600 lbs. Tank will carry 9000 lbs. of coal.	
Number of wheels under tender	6
Diameter of wheels under tender	45 in.
Diameter tender journals	4½ in.
Length tender journals	8 in.

Weight of tender empty	30,420 lbs.
" " " loaded	57,850 "
Tender not fitted with scoop, but goose neck inside.	
Height to centre of boiler from top of rail	7 ft. 4¾ in.
Number tubes	235
Inside diameter of tubes	1⅝ in.
Outside diameter of tubes	1¾ in.
Tube material	Brass.
Length of tubes between sheets	11 ft. 3 in.
External heating surface of tubes	1297.7 sq. ft.
Fire area through tubes	3.38 sq. ft.
Length of fire-box at bottom (inside)	74 in.
Width " " " " "	40 in.
Height of crown sheet above top of grate, centre of fire-box	67½ in.
Inside fire-box material	Copper.
Thickness of inside fire-box sheets, front, back and crown	½ in.
Thickness tube sheets	Front, ¾ in.; back, ⅝ in.
Tube sheet material	Front, steel; back, copper.
Heating surface of fire-box	159 sq. ft.
Total heating surface	1456.7 sq. ft.
Fire grate area	20.55 sq. ft.
Diameter of stack	Smallest, 15⅜ in.; top, 17¼ in.

The following table of weights of water for each one-half inch in height in the tank of this locomotive has been prepared in order to facilitate the measurement of water consumption per horse power and per mile run during the coming tests. This table is applicable to any other tank having straight sides, the same height and the same total capacity, regardless of the contour of the plan. The small differences made by the internal bracing is hardly worthy of consideration, and therefore it will serve as a comparison to assist in the approximate determination of the weight of water for any given height in an ordinary American locomotive tank. This table will illustrate the necessity for a careful determination of such data for each and all of the variable conditions which enter into experimental tests of locomotive engines in order to facilitate the labor incident thereto:

WEIGHT OF WATER BY HALF INCHES.

Pennsylvania. Tank.

Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.	Height in inches.	Weight of water. Pounds.
1	450	8½	3,765	16	6,970	23½	10,045	31	12,990	38½	15,790		
1½	675	9	3,980	16½	7,180	24	10,240	31½	13,180	39	15,970		
2	900	9½	4,200	17	7,400	24½	10,455	32	13,370	39½	16,160		
2½	1,125	10	4,420	17½	7,605	25	10,670	32½	13,565	40	16,350		
3	1,350	10½	4,635	18	7,810	25½	10,855	33	13,760	40½	16,505		
3½	1,575	11	4,850	18½	8,005	26	11,040	33½	13,955	41	16,660		
4	1,800	11½	5,050	19	8,200	26½	11,245	34	14,150	41½	16,860		
4½	2,045	12	5,250	19½	8,420	27	11,450	34½	14,345	42	17,060		
5	2,290	12½	5,470	20	8,640	27½	11,630	35	14,540	42½	17,240		
5½	2,480	13	5,690	20½	8,850	28	11,810	35½	14,730	43	17,430		
6	2,670	13½	5,910	21	9,069	28½	12,015	36	14,920	43½	17,630		
6½	2,925	14	6,130	21½	9,245	29	12,220	36½	15,090	44	17,830		
7	3,120	14½	6,325	22	9,430	29½	12,410	37	15 260	44½	18,055		
7½	3,335	15	6,520	22½	9,640	30	12,600	37½	15,435	45	18, 280		
8	3,550	15½	6,745	23	9,850	30½	12,795	38	15,610	45½	18 430		

An Electric Railroad for London.

Like all ancient cities London has attained its present dimensions from small beginnings. No engineer laid out its streets, as in the case of some of our own cities, but to this day they are to a very large extent simply what they were hundreds of years ago; that is, the roads and lanes of rural England, which have been encroached upon by the ever growing city and whilst being flanked on either side with buildings, have never been obliterated or closed. Modern London being then simply grown on the lines laid down by the cart of the farmer, the packhorse or the village schoolboy of centuries past, is full of crooked old lanes to-day, and contains hundreds of short cuts from one main street to another beneath important buildings, of which the stranger has no idea, but which survive as rights of way, to abolish which would cause immense inconvenienee.

It is not to be wondered at then that the railroad problem of such a city is difficult and expensive. Probably had New York been as crooked and tortuous as London, the elevated railroads would never have been made. London then owes something to its narrow and twisted streets. To overcome this difficulty the city railroads have boldly dived below both streets and houses and pursued a direct line, or away from the central parts have pursued an equally direct route high overhead taking no notice of streets or houses but boldly spanning either with brick viaducts.

There is however a portion of London, which embraces its most important thoroughfares and parks, within which no railroad has yet penetrated. This district has a length of five miles and an average breadth of about two miles. On the borders of this approximately rectangular area there are twenty-one stations of the London District Railways.

There are also no fewer than nine main line stations at various points on the borders of this area, but there is no railroad communication between any two main line stations excepting by going round the circle of railroads which enclose the area and a journey of three miles may require a circuitous route of nine miles to accomplish it.

The general feeling of the public has been adverse to the extension of steam worked roads within the area named, but it has long been felt that some further means of transit was greatly needed. With the recent advance in electric traction it has been considered that the time has arrived for some definite steps to be taken to overcome the difficulty, and a bill has been presented to Parliament entitled the London Central (Subway) Railway, asking power to construct a railroad from St. James street, Piccadilly, via Shaftsbury avenue and High Holborn to Holborn Circus, a distance of 1¾ miles, as the first portion of a scheme which will eventually comprise connecting lines from east to west and north to south of the present 10 square miles of that city so devoid of rapid transit. Like its congener of New York the proposed London line is to be constructed by removing the subsoil of the street to a depth of 12 or 14 ft. and erecting on a foundation of concrete a heavy roof of steel girders supported by pillows and side walls and carrying the street surface on a knuckle plate floor, the street subsurface being concrete. Beneath this roof the trains run in rectangular tunnelways, each way being divided off by thin walls of ferflax or ferrolineum in order that no back and forward air-churning may take place and prevent thorough ventilation. Each line of rails then occupies a separate way. The scheme at present embodies only two lines, one up, one down, for eastbound and westbound trains, but the intention is in future to have two extra lines for fast or through trains. With the exception of a portion of High Holborn, the width of the streets traversed is sufficient to accommodate the four lines of rails and the proposed pipe galleries along and below each curb. The depth of excavating is so little that no interference will arise with the sewers, and it is not anticipated that any danger can arise to any building along the route, as it is improbable that any foundation is of so small a depth as to be above the stratum of repose. In event of any foundation being shallow powers are taken to underpin when necessary. The chief opposition to the scheme comes from shopkeepers along the line of route, who fear that the construction of the line may interfere with their trade, and cannot understand how the construction can be undertaken without doing so, even though they have had before them as an example the far more difficult undertakings of the underground lines, in which it was found necessary to underpin immense warehouses, bridge abutments and other structures, beneath which the line passed. The new shallow subway takes merely the existing street, and passes under nothing larger than a lamp-post.

The fact that the construction of pipe galleries for gas and water pipe, and for hydraulic and pneumatic tubes and various electric wires, will avoid all future breaking up of the street surfaces is an advantage which the opponents of the railroad ignore. By a clause in the bill the motive power is to be electricity, and it is intended to run trains at high speed on a two-minute schedule. Though the present underground railroad does carry large numbers of people there can be little doubt but that its usefulness has been impaired by the great depth below the street surface, rendering it a labor to get up and down long staircases, and also by the poverty of its ventilation, which renders traveling so very disagreeable from the sulphurous fumes of the locomotives.

Both these disadvantages will be absent in an electrically-worked shallow subway.

Some idea of the total amount of travel in the Metropolitan area may be gathered when we state that there are probably 250 stations within that area, whilst in the area proposed to be served by the electric subway the east and west thoroughfares exhibit an almost continuous procession of road cars each way and the streets are loaded to their extreme capacity.

From 8 A. M. to 8 P. M. of any day, the number of foot passengers counted on Holborn is from sixty to seventy thousand, whilst of vehicles in the same time there are about fourteen thousand. In the face of these figures it is almost incredible that any one should think a railroad is unnecessary. The real difficulty of railroad extension in London lies in the purely fortuitous growth of the city and in the almost equally fortuitous construction of the railroads at present existing, considerable difficulties standing in the way of crossing over or under any existing line by any new line, and presenting obstacles to the extension of electric lines from the area in which it has been elected they shall first be attempted to the general outside area.

Speaking generally, such crossings can only be effected by a dipping down of the newer line below the older one, as where a new line traverses the line of a street it is obviously impossible that it should emerge for the purpose of passing over the older line.

That central part of London into which no railroad penetrates is equal in area to that portion of New York bounded by the North and East Rivers, and by 10th street and 110th street, truly a large area to be devoid of rapid transit, though no part of the London area is more than a full mile from some station. Imagine the above-named portion of New York surrounded by a railroad in place of water, and with the rivers removed and the sister cities brought into contact, and some idea may be obtained of the condition of central London in respect to internal communication.

It is intended to construct six stations on the length of 1¾ miles of subway at present proposed for London. This number includes the two terminal stations. The station platforms will be immediately beneath the sidewalks, and entrance to them is to be by doors opening from the sidewalks and giving access to a staircase leading down to the platform, stations at each point being made at each side of the street to avoid crossing the tracks.

Excepting for station purposes, for which it is necessary to acquire possession of vaults or cellars beneath the sidewalks, the scheme proposes no interference with property, the only buildings taken being those necessary for station purposes.

The bill is well backed by influential men and has the support of many others on its merits. It is to be examined by a select committee of the House of Commons in a few weeks' time.

Highway Bridges—Nova Scotia.

Mr. Martin Murphy, Provincial Government Engineer, has sent us some plans of iron bridges, on iron and concrete supports, recently erected in the Province of Nova Scotia under his direction and supervision, which we illustrate. In a paper read by Mr. Murphy in February, 1888, on concrete as a substitute for masonry in bridge work, before the Canadian Society of Civil Engineers, those structures and the necessity of their erection are thus described:

"In Nova Scotia, as well as in other new countries, the improvised wooden bridges of the early settlers supplied their wants for crossing rivers and streams, and, as at each successive stage of progress their numbers necessarily increased, the desirability of more permanent construction became more and more important. The frequent replacement of these timber structures taxed the provincial resources to such an extent that it became urgent that means should be adopted whereby the annual drain on the revenue for their renewal and maintenance might be lessened.

"In 1883, an act authorizing a Provincial loan of $500,000 was passed for rebuilding the old wooden bridges where advisable, with material such as stone and iron. Encouraged by the successful operation and results of this measure, the Government provided two further grants of $250,000 each in the years 1885 and 1887, respectively, making one million of dollars available towards rebuilding those bridges in a more substantial form. Even with the additional votes of the two years last named, two-thirds of the highway bridges of the whole Province could not be erected in the permanent manner contemplated. Nor was it desirable that they should be erected with iron superstructure, because there were many instances where wooden structures or cheap pile bridges could subserve more economically and accommodate equally well the public requirements. In positions favorable for solid foundations; in places where rapid currents are spanned; in situations prone to ice jams, necessitating longer spans, and in saline waters where the *teredo navalis* or the *limnoria lignorum* are active, all other things being equal, iron bridges on stone concrete and iron supports were preferred, whilst in locations of an alluvial nature, in peaty or marshy deposits, or in quicksands, or where fresh water streams keep aloof or exclude those destructive agents, and where artificial foundations would be necessary, but too expensive, wooden structures or cheap pile bridges or other bridges of wood suited to the situation were adopted.

"In carrying out the public works in any country, it is desirable, as far as possible to use the material of the district, and though Nova Scotia can furnish both freestone and granite of excellent quality it cannot furnish either of them in the majority of instances, within the means at the disposal of the engineer. If stone suitable for masonry could be had so that the work could be performed for eight or nine dollars per cubic yard, that material was invariably used; if it could not, concrete was substituted.

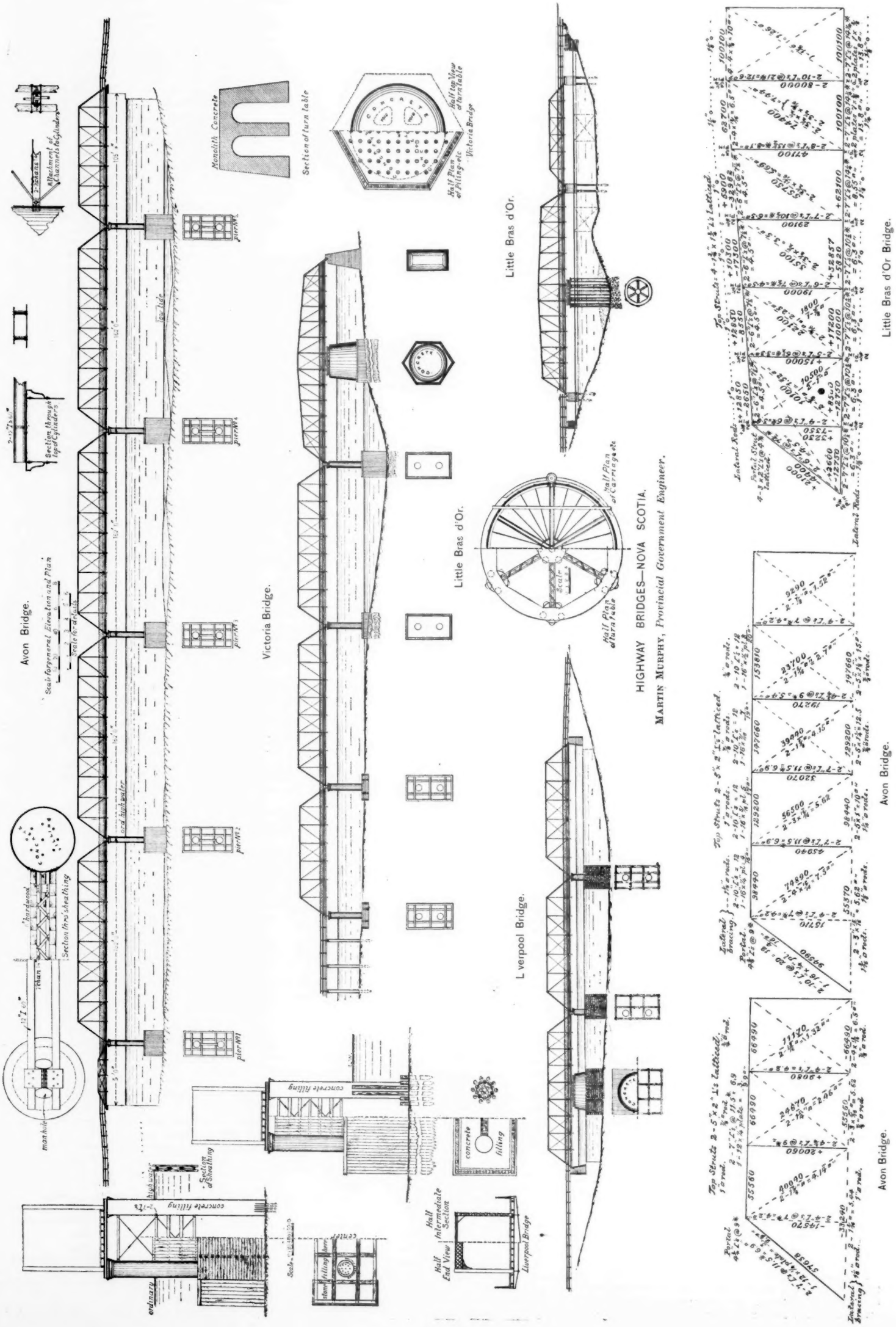
"In the construction of these highway or public road bridges, concrete has borne an important part. It was first—in 1883—employed sparingly and with hesitation, but of late it has been used largely and with much confidence. Its use for the support of the superstructure of iron bridges was prompted by necessity, because of the scarcity of materials suited for ashlar masonry, the cost of transportation, the want of skilled workmen, and the rapidity with which it could be erected with ordinary labor."

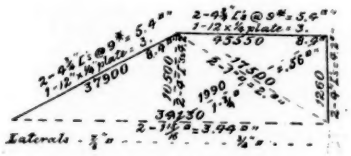
Mr. Murphy says: To build a class of bridges that would insure long service is an easy matter, but to build them so, with limited means, that such a desirable state of existence could be expected from them is rather a difficult problem. If there were no financial restrictions on the operations, and permanency alone were the *desideratum*, then, of course, permanency could be insured by expensive work. Still, we know, the nearer we approach these objects the more satisfactory will be the results obtained. The low price of iron was a great inducement in recommending the adoption of that material for superstructure, but iron bridges require solid and expensive supports to rest upon. Where a stone of a suitable nature could be conveniently obtained, masonry met every requirement, and where it could not, we have endeavored to copy nature in rock making, by substituting monoliths of concrete for masonry in bridge supports. This attempt was new in Nova Scotia, and was attended with some degree of risk, because in such abnormal climates as our own the employment of concrete for bridge piers had not been tested. However, the fitness of things seemed to apply; the induration goes on without, seemingly, being affected by weather influence. Unlike masonry, the concrete improves with age. Its introduction has been attended with very remarkable success, and as its application is being extended its merits are becoming recognized.

With a few exceptions the superstructure of the Nova Scotia highway bridges have been constructed of the American type. All the iron work has been built by contract. The concrete work and substructure of the large bridges have been executed by the government's own engineers and workmen without the intervention of contractors, a system which, however inapplicable in some countries, has been found to answer well in Nova Scotia. The contractors for iron work were: The King Bridge & Manufacturing Co., of Cleveland, Ohio; the Dominion Bridge Co., of Canada; the Hamilton Bridge Co., Hamilton, Ont.; the Starr Manufacturing Co., of Halifax, N. S.; Mr. John Stewart, New Glasgow, N. S.; The Truro Foundry & Machine Co., Truro, N. S., Mr. Daniel McDonald, Pictou, N. S., and Messrs. Rosseau & Mathers, Montreal. The large spans are proportioned to carry a rolling load of from 70 to 75 lbs. per square foot of roadway plus the static load of bridge. The small spans 80 lbs. per square foot, plus weight of bridge.

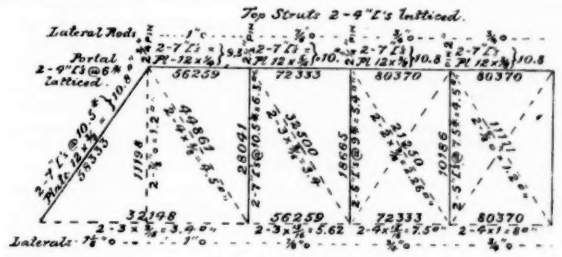
HIGHWAY BRIDGES—NOVA SCOTIA.

MARTIN MURPHY, *Provincial Government Engineer.*

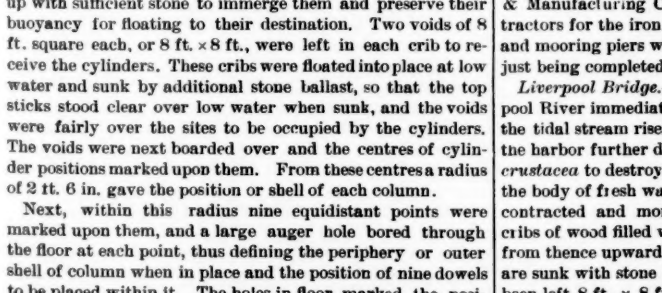




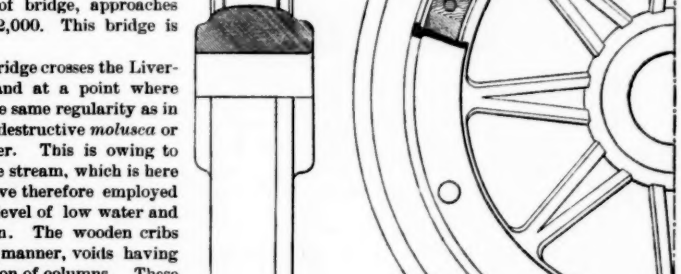
Avon Bridge.



Victoria Bridge.



Liverpool Bridge.



Liverpool Bridge.

The iron is proportioned to a strain of 10,000 lbs. in tension and 8,000 lbs. in compression. All to be of the best quality.

The four bridges selected for illustration are: The Avon Bridge, crossing the River Avon, at Windsor; the Victoria Bridge, which crosses Bear River near its confluence with Annapolis Basin; Liverpool Bridge, crossing the Liverpool River at the town of Liverpool, and the Little Bras d'Or, Bridge, which crosses the Little Bras d'Or between the Island of Boularderie and the main land, Cape Breton.

The Avon Bridge.—This style of bridge was selected for its situation because concrete, so far as yet employed within those phenomenal tidal fluctuations characteristic of the Bay of Fundy, has given satisfaction, whereas, on the other hand in every instance where ashlar masonry has been employed within the same tidal inflence it is more or less a failure. The water penetrates the body of masonry during high tide, and not being able to escape as fast as the tide recedes, or escape altogether, a severe frost operating upon it adds to every successive reflux its expansive influence to the already tottering face stones. The result is, that notwithstanding repeated repairs the piers have to be reconstructed. In view of such tendency experience would lead one to select iron columns filled with concrete. Here, as in all other tidal rivers emptying into the Basin of Minas, the *teredo* or *limnoria* are not known; whether their absence is owing to the silt which is carried about with, and so discolors the tidal stream, or from the fresh water that descends the stream, or from both we cannot say. We know that they are not observable, and that salt baths repeated with each tide preserve the timber. Cribs of timber are therefore selected to protect the foundations and iron and concrete for the bridge supports in this instance.

The substructure of piers consists of five pairs of steel cylinders of from 35 to 48 ft. in height. They are each 5 ft, internal diameter, and are filled with concrete. The shells are ⅝ in. in thickness; they are coupled together by laced beams and sway bracing. The coupling is sheathed over, making the pier dumb-bell shape in section. This method of coupling the columns is employed to unite their strength in resisting impinging blows of ice, as well as to keep the ice-floes from getting caught in the bracing. Cribs of wood were put together on shore and partially filled from ballast floors up with sufficient stone to immerge them and preserve their buoyancy for floating to their destination. Two voids of 8 ft. square each, or 8 ft. × 8 ft., were left in each crib to receive the cylinders. These cribs were floated into place at low water and sunk by additional stone ballast, so that the top sticks stood clear over low water when sunk, and the voids were fairly over the sites to be occupied by the cylinders. The voids were next boarded over and the centres of cylinder positions marked upon them. From these centres a radius of 2 ft. 6 in. gave the position or shell of each column.

Next, within this radius nine equidistant points were marked upon them, and a large auger hole bored through the floor at each point, thus defining the periphery or outer shell of column when in place and the position of nine dowels to be placed within it. The holes in floor marked the position of drill, and the floor itself acted as a platform for the three men to work on it in the ordinary method of rock drilling. The workmen had no difficulty in drilling nine holes into the rock in this way from 2½ to 3 ft. deep, nor in dropping dowels of 2 in. round iron into the drill holes. Thus stood nine iron dowels of 2 inches in diameter, each standing up within the tube to a height of from two to four feet. The cylinder was then lowered to its resting place, and the inside of tube, as well as the 8 × 8 void outside, filled up with concrete. Neap tides rise about 24 or 25 ft., springs 5 or 6 ft. higher.

The superstructure consists of six spans, steel and iron, four of 162 ft. each, one of 110 and one of 50 ft. The Dominion Bridge Co , of Canada, erected all the iron work at a contract price of $32,190. The cost of the whole work is $49,000.

The Victoria Bridge consists of a swing span 162 ft. in length, two fixed spans of 125 ft. each, and one of 100 ft. The swing span revolves on a circular pier 25 ft. in diameter t top finish, entirely constructed of concrete. Each pier for the fixed spans consists of two wrought iron cylinders, 5 ft. each in diameter, filled with concrete, coupled together by laced channel beams and lateral bracing, and sheathed between main tubes to prevent lifting or displacement by ice-floes. There is 18 ft. of water at ordinary low tide in the navigable channel; spring tides rise 29 to 30 ft. The *limnoria lignorum* is here so active that the bearing power of piles, or timber submerged below the level of low water is, where exposed, affected, if not destroyed, within 6 years. This place is a favorite haunt of this destructive crustacean. The supports of the old wooden structure had to be renewed twice within a period of 12 years. The new bridge is placed immediately above the old one, and if founded on piles similarly unprotected would be no less reliable. The river-bed here is characteristic for instability and increasing change, caused by the rapid currents of the Bay of Fundy tides on gravel beds and loose deposits, pointing to piles as most desirable. For these reasons, as well as for one no less obvious, viz., limited means, it was decided to adopt piles and protect them with an envelope of concrete. The hexagonal circuit of close piling is merely placed as a mould to retain the outer walls of concrete whilst the foundations are being put in, and before setting and induration take place.

The piles, driven under base of circular pier, are cut at the level of low-water spring tides, the intervening spaces between them filled with small stone and concrete, and the usual platform of 12 by 12 in. timber framed thereon, thus completing the base of circular pier to the level of low water. The concrete superstructure from this point upward to top is a frustrum of a cone having a solid vertical central pillar, 4 ft. by 4 ft., to support the pivot and four walls, 2 ft. 6 in. each in width, radiating therefrom to outer circular wall or periphery, which is 2 ft. 6 in. wide at top, and increases downward with a batter of 1 in 8. The four voids thus left in the body of the prism have vertical sides to within 4 ft. of the top, where they corbel to an apex, and are covered with 2 ft. of fine concrete. The columns in deep water supporting the fixed spans rest on clumps of piles cut off at the bed of river by a circular saw, two piles being allowed to stand up within body of tube to prevent displacement. The spaces outside of tubes to sheet piling, as well as within tubes, are filled with concrete outside to level of low water and inside of tubes to the top. The King Bridge & Manufacturing Co., of Cleveland, Ohio, were the contractors for the iron work. The cost of bridge, approaches and mooring piers will amount to $52,000. This bridge is just being completed.

Liverpool Bridge.—Although this bridge crosses the Liverpool River immediately at its mouth and at a point where the tidal stream rises and falls with the same regularity as in the harbor further down there are no destructive *molusca* or *crustacea* to destroy submerged timber. This is owing to the body of fresh water descending the stream, which is here contracted and more rapid. We have therefore employed cribs of wood filled with stone to the level of low water and from thence upwards concrete and iron. The wooden cribs are sunk with stone in the ordinary manner, voids having been left 8 ft. × 8 ft. for the foundation of columns. These voids are filled with piles as close together as they could be driven. They are cut off at low-water level as a faucet to rest the columns upon. Some piles stand up well within the body of column, and from base up to top the tubes are filled with concrete. The circular pier for swing from low water up is built entirely of concrete. The superstructure consists of one swing span 124 ft. from out to out, and two fixed spans of 105 ft. each. Mr. John Stewart, of New Glasgow, N. S., was the contractor for the iron work. The bridge and approaches cost $22,000.

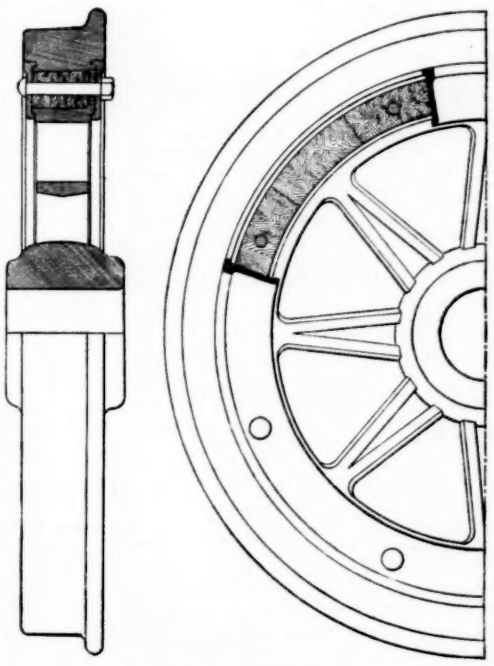
Little Bras d'Or Bridge.—All round the site of this bridge, as well as its environs, is a favorite haunt of the *teredo navalis*, or the *teredo Norvegica*, more probably the latter, of Spengler. The bridge, which is now under construction, is to consist of one swing span 162 ft. and a fixed span of 80 ft. To better subserve the requirements of navigation the pier on which the swing is to revolve will stand in 28 ft. of water at low tide. The pier will consist of a centre cylinder 4 ft. in diameter, surrounded by six cylinders of 3 ft. in diameter each, all coupled together above water level with laced beams. The pivot on which the swing will revolve will rest on the centre tube, and the six other tubes will support a track resting on rolled I beams, covered with ⅝-in. plate. The foundations for tubes consist of clumps of piles cut off at level of bed of stream, one pile in centre of each clump having been cut about six feet higher up. The tubes are now being lowered into position, and will be filled inside with concrete to top, and outside with concrete and stone to a height of 12 ft. from bed of stream. The outer piers and abutments are built of Georgian yellow pine, creosoted by Eppinger & Russell, Brooklyn, New York. The iron superstructure is being erected by the King Bridge & Mfg Co., of Cleveland, O., the iron columns by Messrs. I. Matheson & Co., New Glasgow, N. S. The whole work, including approaches, will cost $18,000.

Besides the erection of the bridges noticed here the provincial government of Nova Scotia have built many large bridges supported by masonry and concrete piers and abutments. No rigid rule for building the substructure or supports of these bridges has been followed; each has been treated as the surroundings and the material of the district would warrant. Many of them are now five years erected, and all give promise of permanency and of justifying the course adopted.

Kitson's Cushioned Wheel.

The cushioned wheel which is shown in the accompanying cuts has been in use now nearly three years, during which time about 40,000 have been put into service.

Cushioned wheels have been used many years in England, but the want of metallic connection between the centre and the tire has been found objectionable with the older forms as well as in the old wooden disk wheel.



Kitson's Cushioned Wheel.

Made by the LEEDS WHEEL & AXLE CO., *Leeds, England.*

In Kitson's wheel the centre is formed with a flange or angle, which is connected directly with the tire when a steel centre is used. When a forged centre is adopted it is connected with the tire by the clip ring (Mansell ring), the bolts or rivets securing the whole together. The wood acts simply as a cushion, the whole of the lateral and

torsional strains being taken by the wheel centre. In this respect this wheel is undoubtedly very well designed.

It is claimed for cushioned wheels that the mileage of tires is very greatly increased, that there is less liability to breakage of wheels or axles, and that the wheels are not so noisy as uncushioned wheels. The disadvantages of wheels with wooden centres or cushions have been found in the United States and Canada to be climatic. That is, the great variations in the degree of moisture in the air have caused rapid deterioration of the wood.

The sole agents for the Kitson wheel are Messrs. Taite & Carleton, 63 Queen Victoria street, London.

Stone Ballast in India.

BY AN INDIAN ENGINEER.

Any one who has studied the reports of railroad engineers, roadmasters, etc., cannot have failed to notice the great difference of opinion that exists on this point. Some prefer clean gravel, others maintain that a little clay mixed with the gravel is an advantage, while some of the leading inspectors on English railroads assert that ashes from the engine shed are superior to anything else, and that with it they not only can make a smoother road but can also maintain it in good order with less men. As in most other railroad matters, there are many different points to be considered, such as description of sleeper, in use, amount of traffic, climatic influences, etc., before it can be definitely settled which is the best, and in many cases the cost is also an important factor. Trunk lines doing a good business, and with which a first-class road, fit for any speed and number of trains, is a *sine qua non*, can afford to spend more money than short lines with poor traffic; but there are many cases in which the use of cheap material has proved the reverse of economical, and a saving of 20 per cent. in first cost often proves a loss of 50 per cent. in maintenance charges.

Although many engineers and inspectors in different parts of the world have recorded their opinions and ideas about ballast, very little has been said about the practice on Indian railroads, and therefore a short description may be of interest. In the early days of railroads in this country, stone ballast was very little used, as in many cases the lines ran for hundreds of miles over level country, and stone was not procurable. In some cases where it was used no care was taken to break it to a proper or uniform size, and although the specifications always stated 2½ in. as the proper size, lumps of 3½ and even 4 in. square, preponderated. With ballast of this size it was of course impossible to pack the road properly, and stone ballast was looked upon with disfavor by many; it was also stated that the Foi and Deodar sleepers then in use were damaged by it, but the real cause was neglect on the part of the native workmen, who did not open out the ballast to a sufficient depth before tamping.

Owing to the reasons above given, and the scarcity of stone in some parts, brick ballast was extensively used, especially where large quantities of broken bricks were available from bridge and station building; and in places where no refuse was available, ballast was specially burnt in kilns or clamps. This was done by working up clay with water until it became plastic, and then forming it into balls varying in size from 3 to 6 in. After drying these in the sun for a day or two a layer of coal and wood was laid on the ground, and on the top of this a layer of the clay balls about 6 in. thick, then a second layer of rubble coal, and so on to the top. These kilns were usually conically shaped, and contained from 3,000 to 4,000 cu. ft. of material. When well made and burnt this made very fair ballast, which lasted from 5 to 6 years; but it was difficult to make the native contractors attend to the two most important points, viz., working the clay well before shaping it, and using the proper quantity of coal to burn it well. When the train loads increased from 400 to 800 tons, exclusive of engine and tender, necessitating a heavier load on each wheel, it was found that brick ballast could not be depended upon, even when it was freshly broken, and it not only required renewing every four or five years, but it also destroyed the creosoted fir sleepers in a very short time. Vitrified brick lasted longer and gave the best results of any burnt ballast; but even this soon turned to dust under the packing hammers, and stone ballast again came into favor and has been largely used during the last ten years, while brick ballast has almost entirely disappeared from the best managed lines.

It must be born in mind that the rainy season in India is very different to an English or American winter. During the four months, June 15 to Oct. 15, from 40 to 50 in. of rain is not uncommon, and from 5 to 9 in. in 24 hours is not sufficiently unusual to cause comment. At the same time, the weather is very hot, and directly the rain ceases, the sun appears with redoubled force, and the rails soon become too hot to handle. Those who made permanent way a study soon found that brick ballast not only damaged the sleepers, but the rails and fish plates also suffered heavily; while during the rainy season, it was almost impossible to preserve good line and surface, or keep the road free from grass and jungle. During the months of April and May the hot winds blow with great force over the greater part of India, and for this reason the use of ashes or sand is impossible unless they are covered—as was the case on the Scinde, Punjaub & Delhi Railway—with a coating of ballast 3 or 4 in. thick. Ashes were tried on some large viaducts, in order to lessen the concession, and so preserve the brick arches, but during the hot weather trains were so smothered in dust that workmen were unable to tell when they were approaching, and the inconvenience to passengers was also so great that the idea had to be abandoned and stone ballast substituded.

In the Northwestern provinces a description of gravel called "kunkur" was extensively used for many years. This is a peculiar formation of limestone, found generally in nodules, sometimes in masses, a little below the earth's surface. It is compact, of a light brown, or ash gray color, and geologists are of opinion that it corresponds very nearly with the drift of Europe. In its composition it is chiefly calcareous, containing about 70 per cent. of carbonate of lime, 12 per cent. of silica, and 18 per cent. alumina, and in many parts of India it is the only gravel obtainable. In some places "kunkur" was dug out of pits close to the line of rails and carefully screened, but no matter how well this was done some mud still adhered to it, and although it made a splendid road during the cold weather, it was slushy and difficult to handle during the rains. The worst fault, however, was the dust, which during dry, windy weather, flew up as the train passed, and damaged the machinery of the engines and the bearings of the carriages, causing 15 per cent. more hot axles than on portions of the line ballasted with stone. The brasses of the side rods, connecting rods, etc., also required lining up and renewing much oftener, and more men were required to keep down weeds. These reasons eventually cased "kunkur" to be condemned, and it has in many cases been taken out and stone ballast carried from 100 to 160 miles to replace it; in fact, all the principal roads in India now use nothing but stone ballast.

As regards quality of stone, black trap, black and gray basalt, blue gneiss and blue granite have been found most suitable, but any hard stone that will break into square pieces is used. Quartz, although hard, shatters very easily, and soon turns into dust under the tamping picks. Slate or shale is too soft, and cannot be packed properly under the sleepers, while sandstone, although used in some cases, cannot be depended upon to last more than 8 or 9 years. The size specified on most roads is 2 in., but a better rule is not to take any pieces under ¾ in. or over 2 in. This excludes chips, although on some of the English lines granite chips, and stone mixed with chips, is considered superior to clean stone.

At the annual meeting of the Institution of Permanent Way Inspectors, held in 1886, one of the members stated that stone ballast deprived the road of elasticity and injured the sleepers by penetrating them, besides causing dry rot. This is exactly opposite to the results obtained in India. Another objection made against stone was that it would be impossible to lift and pack sleepers properly with two or two and a half inch ballast, if they only required raising one inch; but no difficulty has been experienced on Indian railroads in this respect, and lifts of one-half to three-quarters of an inch are easily made by opening out the ballast to a sufficient depth, so that the packing hammer may go *under* the sleepers, instead of striking against the edges.

Cast-iron bowl or cup-shaped sleepers have been used in this country for many years, but have not been found suitable for high speeds, both on account of their making a very rigid road, and the very large number of breakages. For packing sleepers of this class fine sand was used wherever practicable, and in some cases where they were packed with gravel or broken brick, the results were very bad indeed, from 25 to 40 per cent. having failed in two years under moderate traffic. Where sand was used, an upper layer of brick or stone ballast three inches thick was found necessary in order to prevent the sand flying up and damaging the machinery of the engine. In one or two cases where hard stone, 1 to 1½ in. diameter has been used, very good results have been obtained, and the road has been more elastic than with sand or any other description of ballast. During the last few years the use of metal sleepers has increased enormously, principally owing to the introduction of the Denham & Olphert cast-iron sleeper. This sleeper is a combination of the patents of Inspectors Denham and Olpherts, of the East Indian Railway, and has given better results than any other metal sleeper, the breakages being *under a half* per per cent. per annum, against 2 or 3 per cent. where bowl sleepers are used under the most favorable conditions.

The Denham & Olpherto sleepers are laid eleven to a 30 ft. rail, and are packed with the hardest stone ballast obtainable, but owing to the rail being suspended between the two jaws instead of supported on a chair, as is customary with the double-headed rail, the road is quite as elastic as any wooden sleeper road. This tie consists of two rectangular plates of cast-iron, which are connected by a wrought-iron tie-bar ½ in. × 2 in. Provision is made for adjusting the gauge. The tie complete consists of 2 plates with fixed jaws, 2 loose jaws, 1 tie-bar, 2 keys and 2 cotters, and weighs about 230 lbs. The East Indian Railway has nearly 1,000 miles of 5 ft. 6 in. gauge line laid with this sleeper, and is making about 100,000 yearly at its Jumalpur workshops.

Having disposed of the objections raised against stone ballast, we must take up the question of cost, which is in many cases very high owing to the great distance it has to be conveyed. The Government of India and all the leading permanent way engineers are, however, so convinced of its superiority that they insist on its being used. The price paid to the contractors for quarrying, breaking to 2 in. size, and stacking, ranges from 25 to 30 rupees per thousand cubic feet. Loading and unloading costs about ½ rupee per thousand cubic feet, if only one trip a day is made. In some cases ballast has been carried by goods wagons for 40 miles, then unloaded and ferried across the Ganges, reloaded in wagons and run out on the line, where it costs in position 55 to 60 rupees per 1,000 cubic feet, and still it paid better in the end than brick ballast at 20 rupees.

Now, as to cost of labor for maintaining a road laid with stone ballast, compared with roads where gravel or burnt ballast is used: I notice that in many cases both American road masters and English inspectors have recorded their opinion that the different operations of surfacing, tamping, changing sleepers and clearing grass require a larger force of men where stone ballast is used, than is necessary with gravel ballast. The difference in climate may account for this, but it certainly is not the case in India, where the ballast is, as a rule, filled up to within two inches of rail level, and for the 5 ft. 6 in. gauge, is 12 ft. wide at top, where 10 ft. sleepers are used, with a slope of 1½ to 1 ft. With D. & O. sleepers the width is about 1 ft. less, and the tie-bar is left uncovered for a distance of 1 ft. 6 in. in the centre. The slopes, or haunches, of the ballast are worked through with picks at least once a year, and when opening out the road for any cause the ballast is removed with four-pronged rakes, which are also used for filling in the ballast, so that all dirt and dust escape and there is no chance of the stone binding. With gravel averaging from ½ to ¾ in. diameter, it is, of course, easier to correct slight depressions than it would be with stone of 2 or 2½ in., but if the stone and gravel are of the same size, and proper tools are used, the cost will be the same.

For ordinary packing I find that stone requires no more labor than gravel or burnt ballast, and, once put in proper order, it will stand much longer without needing attention. I estimate this as follows: Stone ballast, 1; gravel, 0.75; burnt or brick, 0.50. And this is confirmed by carefully kept accounts on different divisions. There is, therefore, a saving of from 25 to 50 per cent. in the end by using stone.

The cost of removing old and putting in new sleepers is the same with gravel and stone; both are in this case 25 per cent. cheaper than brick.

Next, as to cost of clearing grass. During the rainy season in India I have seen four coolies per mile engaged in clearing grass alone on a road ballasted with broken brick. The ballast in this case had been in the road for about 5 years, and a good deal of it had turned to clay. With gravel, grass will grow at any season of the year, and during the five months, June to October, it gives almost as much trouble in this respect as decayed brick. Grass will not grow on good stone ballast, if it is properly looked after, and the difference in cost of labor for keeping the line clean may be put down as follows, after each has been from 4 to 6 years in use: Stone, 25 per cent.; gravel, 75 per cent.; burnt or brick ballast, 100 per cent.; or, a saving in labor of from 50 to 75 per cent., where stone is used.

On some continental and English railroads furnace slag has been largely used for ballasting permanent way, and I notice that some American engineers speak favorably of it. Cinders are also much in favor on some English lines, but neither slag nor cinders has been much used on Indian railroads, and stone ballast is not only holding its own, but is coming more into favor every day.

The class of labor employed is perhaps the worst in any part of the world, being the lowest paid coolies obtainable. For maintaining a single line of rails on ordinary banks, one mate, or ganger, one keyman and nine men are generally allowed for every four miles; and with this force not only the full width of the ballast, but 3 ft. of the cess on each side also has to be kept clean and tidy, and all renewals made, besides lifting, surfacing, etc. The pay of mates ranges from Rs. 8 to Rs. 16 per month, and a few extra good men in large yards receive Rs. 20 or Rs. 25; keymen are paid Rs. 5, and ordinary laborers from Rs. 4 to Rs. 5. In the vicinity of large towns, where labor is scarce, Rs. 6 to 6.8 per month is sometimes paid to good laborers. These are exceptional cases, and the average monthly cost of labor may be taken at Rs. 14. It must be remembered that although a rupee is nominally worth two shillings, its present exchange value is only from one shilling and four pence to one shilling and five pence, owing to the low price of silver.

There is one point which has not been touched upon, as it is never likely to affect the majority of Indian railroads, viz., the description of ballast which gives the best results during frosty weather. On this point there can be but one opinion wherever stone ballast has had a fair trial, as it is less affected by frost or sudden thaw, than any other description of ballast. This alone is a strong point in its favor, as the road not only requires less repairs, on account of heaving less, but when anything has to be done it is not necessary to wait for fine weather before commencing the work.

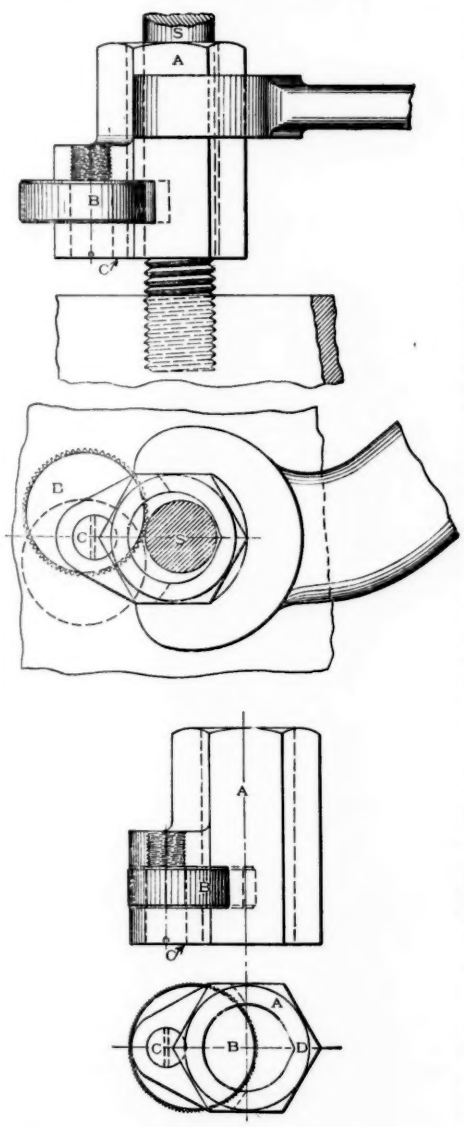
In one or two cases stone ballast has been condemned owing to its not being properly used. In one instance the dirty ballast and mud was cleaned out level with the bottom of the sleepers, and new stone ballast filled in its place. This, of course, prevented the grass from growing, and the road looked neat, but the sleepers were still resting on their old bed, and there was no more elasticity than before. The proper course is to give the road a slight lift, *after* putting in the new ballast, so that there may be, at least, 3 in. of stone *under* the sleepers. This can be repeated the next time the road needs repair, and in a few years the sleepers will have a good foundation. When, owing to tunnels or over bridges, the line cannot be lifted, the only way is to clear out the old ballast between the sleepers to a depth of 5 or 6 in. below the bottom of sleepers, and after filling this space with good ballast, move the sleepers on to it, and then remove the dirt from the old bed of the sleepers. These places can be, in turn, filled with stone and the sleepers returned to their original position. This is a slow and expensive method, and should never be resorted to when it is possible to lift the road.

When a new line is being constructed, at least 1 ft. of ballast is spread on the bank before the sleepers are laid, and by the end of the third year, owing to the bank sinking, etc., there is from 1 ft. 3 in. to 1 ft. 6 in. of ballast under the sleepers.

A New Stud Wrench.

The stud wrench shown in the accompanying illustration is one in use in the mechanical department of the Pennsylvania road, which was invented by Mr. John D. Bowman, Assistant Mechanical Engineer. This wrench has proved to be of value in removing studs, locating pipes and various other work which would be liable to injury with the ordinary forms of grip wrenches. When this wrench once takes hold it need not be loosened until the stud is screwed firmly into position. It can be used for holding or turning studs, bolts, and other round metallic bodies used in mechanical construction, and can be operated with the ordinary monkey wrench. It will turn the work in either direction without mutilating it.

It consists of a hexagonal shaped tube or sleeve *A*, made of cast steel or malleable iron, having projecting lugs on one side, between which a serrated eccentric roller *B*, made of hardened tool steel, is pivoted on a bearing *C*. In one position this roller projects through a slotted opening into the bore of the tube to grip or bind the work, while in the other position, when it is turned outward, it leaves the bore of the tube entirely clear so that it can be slipped over large sized studs or bolts. The throw of the eccentric governs the range of sizes that the wrench will operate on. The eccentric roller has its edges on the flat face slightly turned down so that dirt or scale will not interfere with its free movement between the holding lugs. The sleeve or tube has a slight V-shaped recess filed or slotted in its opening (similar to ordinary lathe dogs or carriers), directly opposite to the centre line of the pin holding the eccentric roller, as shown at *D*, so that the stud, pipe or other work to be operated



upon will be held at two points back of where the eccentric roller grips it.

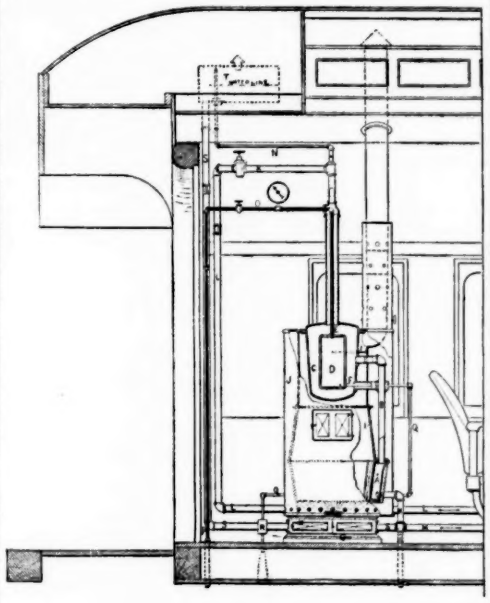
The tube or sleeve is also made with one side open so that it can be hooked over a long length of rod or pipe in cases where it would be inconvenient to slip it over the end. It is also made with two sets of lugs, at opposite ends, and two eccentric rollers, and is then used as a coupling to take out studs from places where it would be inconvenient to use a wrench on the body of the stud. This movement is accomplished by putting the stud wrench on the stud to be taken out, gripping it with one of the rollers and inserting a rod or long bolt into the upper end of the stud wrench and gripping it with the upper roller, then turning the whole from above by the ordinary wrench, or another stud wrench.

The eccentric roller grips the work with a force increasing with the resistance of the work to turning, or power applied to the wrench, therefore it is impossible for it to slip and mutilate the work to which it is applied. This tool has been found to be of advantage in putting in and taking out studs in locomotive cylinder heads and steam chest seats. The form of the wrench being hexagonal, the several "holds" for turning the work can all be taken by the wrench, and there is only one grip made on the work itself, this being an indentation, it has no tendency to curl or enlarge the body of the work, as is found to be the case when tongs or alligator wrenches are used.

The Non-pressure Car Heater.

This is a system designed for heating trains by water circulation, the water being heated either by the independent heater in each car, or by steam taken from the locomotive.

When the steam heat is used the steam pipe *E* enters the water system through the vertical pipe above the heater and passes down to a steam drum *D*, which is inclosed in the



water circulating vessel *C*. From the lower part of this steam drum the pipe *F* carries the water of condensation into the circulating pipe *B*. A waterback *A* is placed in the lower part of the heater, and occupies one-quarter of the circumference of the fire pot. Connecting with this waterback are two circulating pipes, which enter the circulating vessel at different levels. The water circulation is open to the atmosphere at the tank *T*. The steam drum is 6 in. by 12 in ; the steam pipe *F* is ½ in. internal diameter, and the water pipe through which it enters the circulating system is 2½ in. diameter. The circulating vessel *C* is made 18 in. high and 12 in. diameter, and surrounded by deflecting plates, the object of which is to prevent the gases of combustion passing directly from the combustion chamber to the chimney. The cast-iron fire pot is fed through the door shown. The base of the heater is 22 in. square, and its height about 50. The approximate weight is 400 lbs.

It is designed to apply this system to any ordinary system of hot-water circulation. To do this the pipe *L* is connected with the additional pipe *K* fitted with a gate valve from the heater. One of the openings of a tee is placed on the return pipe *M*, which is connected to the heater by a right and left nipple with a blow-off cock below. The other opening of the tee receives the supply pipe *S* and communicates with the supply tank. The air pipe *N* has an open end in the supply tank, and the plug in the tank is replaced by a hood and filling nozzle, left open to the atmosphere. The steam pipe *P* is connected with the ½-in. steam pipe *O*, which has a valve and pressure guage. The waste pipe *Q*, which connects with the pipe *F* from the bottom of the steam drum, passes to the trap *R*, and is conducted to the floor of the car.

The supply tank and air pipe being open to the atmosphere, there is no pressure except that due to the head of water. Water or brine is introduced through the filler on the tank, and when steam is turned on, or fire lighted, it is said that the circulation is quickly established, with no special care to secure the expulsion of the air from the pipes. The valve on the steam pipe *O* is not necessary if the steam supply is controlled from the locomotive. It is claimed by the company that this system can be used successfully with any of the ordinary systems for water circulation. The use of a water circulating system open to the atmosphere is not new, it having been practiced to some extent with some of the other existing systems.

This system is made by the Combination Stove & Water Heater Co., of New York.

THE SCRAP HEAP.

Notes.

Judges Gresham and Blodgett, in the United States Circuit Court at Chicago, April 22, decided that the Wagner Palace Car Co. had infringed the Pullman-Sessions patent on iron frame plate device for vestibule cars, and issued a decree ordering the Wagner Co. to cease using all devices infringing the patent after May 20, instant. The counsel for the Wagner Co. referred to the fact that his company had given large bonds for damages, and that it would take a long time to dismantle the cars now equipped with the vestibules. Cars were in great demand just at present, and each one would have to spend a considerable time at the shops. The Pullman Co., on the other hand, claimed that the Wagner Co. had had ample notice; that of 450 cars owned by that company only 90 had vestibules, and that the iron frame plate could be removed from a car in two hours.

Twelve men riding on a hand car were killed by a train at Tuluco, Mexico, April 27.

Numerous rumors have been current at Chicago concerning contemplated reductions of wages of employés of a number of roads, and a possible strike in consequence. Extensive inquiries have been made by the reporters, but the railroad officers quoted all assert that they know of no intention to reduce wages. It is claimed, however, that a certain detective agency in that city is examining applicants for positions as locomotive engineers, and that a number of men have been conditionally engaged.

It is announced by the Southern Pacific at San Francisco that the Golden Gate Special will make its last trip on Saturday, May 4. It is at the same time stated that a new overland passenger train will be at once put on to run daily, making the trip from San Francisco to Omaha in three days. Seventy-two hours would be about six hours quicker than the present daily trains make the trip, and about twelve hours slower than the time made by the Golden Gate Special.

The Railroad Commissioners of Georgia have notified the roads of the state to hereafter make their fiscal years terminate June 30.

The Riley Railway Construction Co. has secured a location near Revere Beach, Mass., for the construction of about a mile of its elevated railway structure. Work will be commenced very soon, and the section will be completed by July 4 next. Electricity will be the motive power, and the cost of road and equipment will be about $50,000.

A Limited Express Train in France.

According to the *Journal des Transports* a limited express train, composed of sleeping, parlor and dining cars, runs from Paris to Biarritz every Wednesday and Saturday evening, leaving Paris at 6:40 p.m., and arriving at Biarritz the next morning at 6:55. The return trips from Biarritz to Paris are made on Sunday and Wednesday, leaving Biarrtz at 6:40 a m., and arriving in Paris at 6:50 p.m. The distance is about 484 miles,

A Superintendent's Duties.

The varied duties of a railroad manager are not often described by one who is able both to speak from experience and to express his ideas succinctly; we therefore print the following from Mr. Theodore Voorhees. It appears in his article in *Scribner's Magazine:*

The superintendent of a railway in this country who has, let us say, three hundred miles of road in his charge, has perhaps as great a variety of occupation, and as many different questions of importance depending upon his decision as any other business or professional man in the community. Fully one half of his time will be spent out of doors looking after the physical condition of his track, masonry, bridges, stations, buildings of all kinds. Concerning the repair or renewal of each he will have to pass judgment. He must know intimately every foot of his track, and in cases of emergency or accident, know just what resources he can depend upon and how to make them most immediately useful. He will visit the shops and round-houses frequently, and will know the construction and daily condition of every locomotive, every passenger and baggage car. He will consult with his Master Mechanic, and often will decide which car or engine shall and which shall not be taken in for repair, etc. He has to plan and organize the work of every yard, every station. He must know the duties of each employé on his pay-rolls, and instruct all new men, or see that it is properly done. He must keep incessant and vigilant watch on the movement of all trains, noting the slightest variation from the schedules which he has prepared, and looking carefully into the causes therefor, so as to avoid its recurrence. The first thing in the morning he is greeted with a report giving the situation of business on the road, the events of the night, movement of trains and location and volume of freight to be handled. The last thing at night he gets a final report of the location and movement of important trains; and he never closes his eyes without thinking that perhaps the telephone will ring and call him before dawn. During the day in his office he has reports to make out, requisitions to approve, a varied correspondence, not always agreeable to answer. Added to this, frequent consultations with the officers of the traffic department, or with those of connecting lines, in reference to the movement of through or local business, completely fill his time.

Railroad Collision in China.

On March 25 a butting collision of passenger trains on one of the lines of the China Railway Company's system resulted in the death of twelve native passengers and two trainmen.

The New Station at Hartford.

The new passenger station of the New York, New Haven & Hartford road, in Hartford, will be occupied by the company next Sunday. It is the largest and most costly structure on the line outside of New York city, and is built of Longmeadow brown stone. The total length of the building is 476 ft. The north wing is 136 ft. in length and the south 161. Each wing is 40 ft. in width. The general waiting room, which is between the two wings, is 175 ft. long by 60 in width. It is finished in oak throughout and is elaborately equipped.

The Hamilton Accident.

An eastbound express train running at full speed was derailed at Junction Cut, just west of Hamilton, Ont., on the Grand Trunk road, on Sunday morning, April 28, about 7 a. m., resulting in the death of some 20 passengers and the injury of a dozen others. The train consisted of 10 cars, and was descending a grade at the foot of which was a reverse curve. The engine jumped the track on one of the curves (one report says on passing a frog) and, striking off on a tangent, crashed into a water tank with tremendous force, having run only about 200 ft. after it left the rails. The tank full of water immediately rushed down to a marsh at one side of the road, and the engine, tender and building were piled in one heap. The two baggage cars were pushed to one side, and the two passenger cars following were shattered to pieces against the engine. The wreck immediately took fire and an indefinite number of passengers were burned up. The estimate is eighteen, as stated above, but all of them were from distant points, and but little progress has yet been made in identifying the victims, or even ascertaining the exact number. In addition to those burned two passengers were taken out dead before the fire started. The engineer and fireman escaped comparatively uninjured, although they remained on the engine. No definite information as to the cause of the derailment has yet been given, though there are reports that one of the axles of the engine was found broken in a way showing that the breakage could not have resulted from the derailment.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The communication on rail joints, which appears on another page, is from an engineer who has had great experience, having been for years in charge of track on a road with very fast and heavy traffic. He must therefore have accumulated a great deal of accurate knowledge concerning rail joints, and it is only in the light of such knowledge, drawn from actual experience, that any valuable discussion of this complicated subject can be had. It is one of those problems which cannot be reasoned out from theory, but can only be solved by accumulating a great deal of positive evidence and carefully weighing it. Mr. P. has therefore no right to assume the attitude of Brer Rabbit and wait for time to teach others the lessons that he has already learned. He has a professional duty in the matter. When he tells us of the great number of angle splices broken on a certain road, he tells nothing of any value, or that carries any lesson whatever unless he tells also what the section and weight of those splices was, something of the traffic that they had to stand and of the general condition of the track in which they were placed. The testimony concerning the endurance of the heavy angle-splice on which we made the statements in the editorial last week comes from the men who have used it and is very definite and positive. On the other hand, if our correspondent has evidence to the contrary which is also definite and positive, it is his duty to make it public.

A curious illustration of the tendency to legislate on matters of technical practice in railroading comes from Michigan. In the Legislature of that state a bill has been introduced on the subject of cattle guards. This bill contemplates the adoption of a standard cattle guard for the state, with the recommendation that it be made standard for the whole United States. That a Michigan statesman should have discovered the ideally best cattle guard, and should therefore feel warranted in closing the matter for his state and for the United States, seems on the face of it remarkable. If he has not found the best cattle guard, what he proposes to do is simply to arrest progress in that direction, and at the same time put burdensome restrictions upon railroad companies. The associations of railroad officers frequently have this same problem brought up before them for action. No convention passes in which some inventor does not make an effort to have his special device sanctioned by official action of the convention. Even at the recent meeting of state commissioners in Washington a persistent effort was made by one commissioner to bring to the attention of the convention one of a thousand inventions for the protection of crossings. Most of the members of the railroad associations, as well as state commissioners of larger experience, have long ago learned to avoid such pitfalls, and it is only the greener ones who allow themselves to be drawn into schemes for forwarding the interest of particular inventors. The Michigan lawmaker who proposes to settle the question of cattle guards is probably no greener in these matters than the majority of people who attack such questions in the state legislatures. He assumes that the railroads of the land could be much better run by "country lawyers and other wise fellers" than by men who have been trained all their lives in a most arduous and complicated business, and swallows whole the first patent "safety device" that is offered him. That his bill will not pass may be safely predicted, but that such a bill was even reported from the committee for the consideration of the legislature is a reflection upon the sagacity of that body.

The New York & Boston steam-heated electrically-lighted limited express ("the pride of New England," as reported in the New York *Times*), was involved in a slight collision on the Boston & Albany, at Springfield, one rainy night last week, and the officers of the road are said to be "very much concerned" over the affair. No one was hurt, but the newspapers demand an investigation by the Railroad Commissioners, and discuss the advisability of "special rules when tracks are slippery." The manifestation of so sensitive a public opinion aptly illustrates the difference in sentiment characteristic of an old and thickly settled community with an energetic railroad commission, which has taught the people to expect the fullest publicity of railroad affairs, as compared with the feeling in other and different communities. Trains as costly as this one, and patronized by as "high-toned" people, running at similar speeds, and as vigorously boasted of as this, have been involved in quite serious accidents more than once during the past year or two, and passengers' lives have been seriously endangered, but public investigations of the facts have been conspicuous by their absence. The Springfield accident is somewhat peculiar, and an investigation by the commissioners will be eminently proper. The train was descending a 50-ft. grade, and was running probably 50 miles an hour. A freight was detained on the track ahead, and a flagman was sent back. The runner acknowledges that the flag was back a reasonable distance, but yet does not explain why he did not stop in season. It is said that he applied the brakes (the quick-acting automatic) in good season, but that they did not hold properly. He then reversed his engine, and with the aid of this would perhaps have stopped, but both cylinder heads were blown out. Two freight cars were derailed. Some suggestive stories have been told lately concerning the inefficiency of brake rigging on certain fast trains of other roads, particularly those with cars running on twelve-wheel trucks, but the cars in this train have all their wheels braked, we believe. Whatever the lesson of the accident, however, all railroad men want to know it; or at least they ought to want to.

There is as yet no adequate explanation of the terrible derailment at Hamilton, Ont., which is chronicled in another column of this issue. It is said that an axle has been found with a break which probably was *not* caused by the derailment or by anything that happened afterwards, but no intelligent testimony concerning it is published and there is little prospect that there will be any, except in the statement that the coroner has requested the opinion of a townsman "who is skilled in iron work and engines." Perhaps the most important lesson to be learned at this time, after so many and so various warnings, is a realization of the need of a competent and impartial tribunal to publish the true facts and their bearing in cases of accidents like this. As in the the case of Mud Run, and of the St. George disaster, so near the present one, only a few weeks ago, there will apparently be no better means than that afforded by the report of an ordinary coroner's inquest to enable people to study facts whose value to all railroad officers may be of the highest importance. It is true that managers can generally get from the columns of the daily press an accurate general idea of the causes of great train accidents, but such information is not in a form to be impressive and it often does not receive its true weight. Not the least of the benefits of an investigating body like the railroad department of the British Board of Trade is the regular and uniform publication of facts necessary to be known, and their publication in a readable form, embodied in forcible language, by an authority commanding respect. A private expert appointed by a coroner or even by a court does not answer the purpose, even if he is perfectly competent to form a correct judgment. He may do that much and still be unable to state his views so as to convince other men, or he may express his thoughts in the clearest language and still lack power because he is unknown to those who should be guided by his decisions. The burning of the wreck is said to have resulted from fire communicated from the locomotive; but the descriptions indicate that the first two passenger cars were wrecked badly enough to demolish any stove or other structure within them of less strength than ⅜ in. boiler iron. With such an object lesson as this, it should be unnecessary to speak to intelligent men of the necessity of continuous heating, whatever may have been the origin of this particular fire.

Standard Couplers.

The correspondent who writes in another column on the subject of couplers takes as his starting point the fact that the Inter-state Commerce Commission has issued a circular asking for information on the subject of freight car couplers, but he does not stick very closely to his text. Without expressing any opinion as to the probable results of interference in this matter by the Commission, or as to the usefulness of the action of the Master Car-Builders' Association in recommending the vertical plane coupler known as the M. C. B. type, he seeks a solution of present difficulties in a standard non-automatic (that is, link and-pin) draw bar. Who should select this standard, or how the use of the standard should be secured when selected, he does not say. Ostensibly he writes to keep the Inter-state Commission from falling into the errors made by the state commissioners. We may suppose, therefore, that he would have the national commission select a national draw-bar. It is a grand and simple idea.

Singularly enough there appears in one of our contemporaries a letter said to have been written by a prominent Eastern master car builder starting from the same text. That communication reviews hastily former efforts to get standard couplers, and shows the complete failure of the attempt to bring about uniformity by law in Massachusetts. It is said that the "danger, accidents and expense resulting from this movement by the legislatures of the different states can never be truly estimated." The writer adds; "the Master Car-Builders' type of coupler has been in service and tested, and is pronounced by practical men as dangerous and weak in construction, as all the swivel-head vertical hook couplers are. Although comparatively few are in service, the call for parts for repairs is steadily increasing, and many of the large railroads advocating and voting for this type of coupler, after a thorough trial, have abandoned its use on account of the grave disadvantages encountered, and would now vote against its use."

The conclusions of this writer are that the movement for an automatic coupler is a flat and complete failure; that a standard non-automatic coupler should be adopted, and that Congress, endowed with wisdom not granted to state legislatures, should decide upon this standard and compel its use. In order that Congress may not be embarrassed in selecting the best link-and-pin coupler the eastern master car-builder kindly names it. Meantime it is suggested that the railroads, through "their master car-builders in convention," should "bring this automatic coupler question to a sudden collapse."

These two communications illustrate the muddle into which people fall when they undertake to reconcile by law the conflicting interests of owners of patents and the conflicting ideas of those whose duty it is to design or select apparatus for the complicated service of the railroads. It is acknowledged that car coupler legislation has done more harm than good; that the couplers selected by the various state officials have failed to meet the requirements of service, not merely because different types were authorized, but because many of those selected were mechanically weak. And yet it is assumed that Congress, by the operation of some force not explained, will select out of the great number of link and-pin couplers one so superior to the rest that the general government would be justified in requiring the railroads to give up the draw bars now in use on something like a million cars, and re equip with the standard selected. The mere statement of this part of the argument of the writers of the two letters under consideration is enough. It answers itself.

That any disinterested person should at this late day advise any effort to select a standard link-and-pin coupler is surprising. It is still more surprising that he should ask the Master Car-Builders to recede from their action in the matter of the automatic coupler. That action was taken after the most careful and deliberate investigation. Few people realized then, few realize now, how difficult the problem was, or the care with which it was examined and discussed. The

Master Car-Builders were much criticised for their deliberation in taking final action, but with commendable, and indeed with most judicious firmness, they declined to act till they got ready. They found 4,000 coupler patents and not one coupler that could be recommended. They made tests, they studied, they learned, and they educated others, and the form of coupler as finally adopted was the result of evolution. Even at the end no one coupler was adopted, but a type, leaving the field open to a number of competing makers, and free to inventors. If all of the labor of the committees of the Association and of other investigators settled anything, it was that the vertical plane coupler is the best type, that the principle of contact of cylindrical surfaces is the true principle, and that link slack is wasteful of energy. And yet we are asked to throw away all that has been learned in the last five years and go back to a link-and-pin coupler.

It is said that the M. C. B. coupler "has been found dangerous and weak in construction and that the call for parts for repairs is steadily increasing." This is mere assertion. It has no value without figures. That the call for parts for repairs should increase as the number of couplers in service increases is credible enough. Nothing has yet been found that does not demand a certain percentage of repairs. Mistakes have been made in the M. C. B. coupler—mistakes in design and in material, and it is an unfortunate fact that the well designed and well made couplers have had to suffer from the failures of the weak ones. The credit of the new coupler has suffered too from other causes, and it has not progressed in the last year as it should have done. Nevertheless the progress made has been substantial, and we feel confident that in the next year it will be greater than it has been in the last. Not only have the railroad men learned something about couplers in the last year's experience, but some of the coupler men have had lessons in business that will not be lost.

The assertion is made that "many of the large roads advocating and voting for this type of coupler, after a thorough trial have abandoned its use." This statement is so well contrived to mislead that it betrays at once the writer's want of candor. No thorough trial of the automatic coupler can be made without running a considerable number of cars, fitted with it, in service together. It may well be that a road which has put on a few M. C. B. couplers and been unable to keep them together has found the great inconvenience of mixing the two types of couplers This is what everybody expected. It is quite possible, too, that some of the roads have put on couplers of inferior material or workmanship, or badly designed in details. It is well known that some such have been turned out, but, as we have said, some of the coupler men have been learning a new art as well as the railroad men.

To talk about a standard link and pin coupler is almost ridiculous, if not quite. The patterns used by the different roads answer the purpose about as well as a standard of the type could, and only the most stringent general law could force the roads to scrap the draw-bars now in use and adopt something little or no better. When they make such a change it will be to take up an automatic coupler, and so save the mutilation of train and yard men, and to adopt a close coupler, and so prepare for air brakes and fast freight speed. Any change that stops short of these results will of necessity be temporary, and will not be thought worth making.

The writers of the letters which we have been considering would impress upon the Commissioners or other officers charged with the duty of enforcing the use of standards that may be adopted the fact that after all an automatic coupler is not a very useful thing. They hold the opinion that what is wanted is *standards*, among others a standard height of draw-bar above the rail. As long ago as 1872 the Master Car-Builders' Association adopted a standard height and it has remained ever since the standard of the Association. How many freight cars are built closely to that height we cannot say, but it is quite obvious that the great majority of the freight cars of the country are so close to it as to cause no trouble in coupling. The cases in which a man is injured from inequalities in the height of draw-bars are relatively very rare.

Attention is asked to the fact that the yardmen want no automatic couplers. We are all familiar with this story, which is most delusive. Of course they want no automatic couplers until all cars are so equipped. It is notorious that the dangers of coupling are increased by the introduction of a few automatic couplers, but it is the first step that costs in most affairs of life. It is unfortunate, but it is true, that the automatic coupler has to contend with the prejudices of the very men who will be most benefited by it; and, indeed, that they must suffer during the transition period. It would be too much to expect that they should be enthusiastic in a cause the benefits of which to them personally seem pretty remote. Meantime their testimony in the matter must be taken with allowances. On the whole, we do not look for a severe set-back to automatic coupling from this new agitation.

Principles Involved in Passenger Rates.

A recent article in the *Zeitung des Vereins Deutscher Eisenbahn Verwaltungen* contains some remarkable statements about Prussian passenger traffic. It appears that of the whole number of tickets sold sixty per cent. are round trip or commutation tickets, and that the average reduction on such tickets, as compared with regular single journey rates, is about thirty per cent.

For a country which points with pride to its carefully constructed schedules, and which pretends to base rates upon cost of service, these variations are very large, indeed. The actual state of the case is substantially this: Round trip tickets in their various forms constitute the bulk of the traffic. One-way passengers are charged, on an average, nearly one-half more for the same service. How can this be justified by people who pretend to believe that cost is the basis of rates? They cannot claim that the round trip ticket insures more equal loading in both directions. In case of an issue of return tickets good from Saturday to Monday, it insures that all the load shall be in one direction at one time—unless, indeed, they are willing to let a large part of their equipment lie idle for nearly forty-eight hours. They cannot claim that round trip traffic is more regular; on the whole, it is probably less regular than one-way traffic. They may perhaps claim that they get better trainloads. This is certainly true of special excursions, in which car space is utilized to the utmost; but it is doubtful whether it applies with any force to the ordinary return-ticket holders.

The matter is brought to a point, in a discussion which has recently arisen in Germany, as to whether return tickets are not transferable. Some people have claimed that they are, or at least that they ought to be. Of what consequence is it to the railroad, they say, whether it transport one man or another? The cost is the same in the two cases; if, therefore, the railroad is willing to transport *A*, but will not transport *B* on the same ticket or at the same rate, it is guilty of discrimination.

If a railroad pretends to make cost of service the basis of its rates, this argument is extremely hard to answer. If the matter is pushed to the bottom, it may be the means of forcing the government to abandon either the practice of issuing round trip tickets at greatly reduced rates, or the theory of basing rates on cost of service. The latter seems much the more probable alternative. Prussia needs money; it makes a good deal of money out of its railroads; and no small portion of this railroad revenue is derived from passenger business. It is not likely that Bismarck is going to give up a million dollars for the sake of a theory.

On American principles there is no difficulty whatever in explaining why round-trip and commutation tickets may be issued at lower rates than regular one-way rates. It is because a quantity of traffic can be developed in this way which would otherwise stay at home and be lost altogether. The difference between ordinary and excursion passenger business is like the difference between high-class and low-class freight. Some classes of freight vary little in amount, with a slight increase or decrease of freight charges. They can afford to pay the high rate; they will not expand largely in response to a reduction. Such articles are put in higher classes. On the other hand, there are cheaper goods on which a high freight tariff is almost prohibitory, but which will be shipped in very large quantities if the rate is made low enough; these are classed lower, and charged less than the others.

One-way passenger business is like high class freight shipments. For the time being, at least, most of it is bound to move any way, whether the rates be high or low. High passenger rates may discourage travel in the long run, in the same way that high parcels rates may discourage trade; but the effect in either case is slow and rather indirect. On the other hand excursion and commutation business is like low class freight. If charges are high, next to none of it will be moved; if they are low, there is scarcely any limit to its development. The one-way traveler must, as a rule, make his journey whether the charges suit him or not; but the excursionist can stay at home if he chooses, while the commuter will locate himself elsewhere if a road does not make satisfactory rates for him.

The economy in developing this traffic lies in the better utilization of the road which results from it. It is not that excursion or even commutation traffic is in itself so much cheaper than ordinary traffic; but because it represents so much added business, which is profitable if it pays anything above the direct expense of handling it. How far it pays to favor these classes of traffic, is a question on which railroad men differ. The impression, on the whole, is that commutation business pays, indirectly, at least, at rates which seem at first sight absurdly low; but that excursion and round-trip reductions may readily be carried too far. These are matters which have to be settled differently, according to the different circumstances of each particular railroad; but the question of developing traffic is usually a more immediate and important one than the question of relative cost of service.

A special question with regard to rate reduction has recently come up before the Inter-state Commerce Commission. Many of the roads have been in the habit of making lower rates for large parties of travelers than they would give where tickets are purchased singly. This practice the commission condemns. We do not see how any other result was to be expected. After the decision in the Providence & Worcester case, nearly two years ago, when it was held illegal to make lower rates for ten car-loads than for a single car-load, it would naturally be considered discrimination to make lower rates for passengers in groups of ten. It is true that the cost of handling parties is probably less than that for individuals; but the same difference holds good for groups of car-loads as compared with single car-loads. And, as the commission rightly said, the railroads are not free to make great variations for slight differences in cost. A railroad is not a merchant who may sell transportation cheap to those who take it at wholesale. It is an institution with public functions and duties of its own. One thing which is at once its duty and its advantage is to make low rates when traffic will thereby be developed. But this does not mean the development of the traffic of one man at the expense of another. Any such one-sided development hinders rather than helps the object in view.

The whole question is as yet in its most rudimentary stages. Many of our roads have made so much money from freight and so little from passengers that far more attention has been paid to the principles which underlie freight rates. In the immediate future, passenger business must become relatively much more important. The increased density of population and the decreased profit in freight shipments must both tend toward the same result.

State Control in Technical Matters.

In another column a correspondent demands a solution of the difficult problem of enforcing intelligent treatment by the railroads of some of the technical questions now before them. He presents arguments which are not so weighty as they appear, though he is not without very respectable company in supporting them. He has, however, suggested the main difficulty in the case, and has struck the root of the matter, and the feature which has thus far baffled all those who have tried to discover the true adjustment of the conflicting relations between the public and railroad capitalists, when he asks what the legislatures are to do in the matter. The problem is here presented in a nutshell.

Railroad owners must be allowed to make some money; after it is made they must spend it either for the public or themselves. To decide how much shall go to reducing rates, how much to putting on automatic brakes and couplers and how much to dividends or to extending the road, is difficult enough; to go beyond this and decide which of these objects shall take precedence this year, and whether the same order shall be followed next year, is a question which legislation generally finds impossible to successfully grapple with. To draw the line at the right place is as difficult as to fix by law the rate of day wages all over the United States at $1.50 or $2, as was proposed by a member of Congress last year. The present situation in Iowa is typical. The state has reduced the railroads' incomes and the railroads have reduced their service. Shall they be compelled to replace the trains which they have taken off? It is of course possible to do this if the state chooses to exert its full power. In Massachusetts the Commissioners a few years ago decreed that the New London Northern must run a

certain local passenger train whether it paid expenses or not. Here was a clear case which involved the possible bankruptcy of the road. The commissioners said, in substance, This road was built to accommodate these towns, and it must continue to do so as long as the receipts are sufficient to pay for labor, supplies and repairs. Of course when this policy should have run itself into the ground the question would come up whether to sell the road at a heavy sacrifice, or to reduce the train service, with the prospect that the latter would ensue which ever way the decision might be. Now, to apply this rule generally to Iowa or any other state, is no easy task. The state at the very outset must experiment. But legislatures work slowly, and if the roads are squeezed too tightly the economical growth of the state will have received a severe check before the remedy can be applied. If the restriction imposed is not enough to retard progress the public are impatient at the continued fatness of the railroad company's coffers. Meanwhile various other elements affect public opinion and the policy of the state may not be held in one course long enough to enable one to definitely diagnose its tendencies. Thus we see that the state has difficulty in managing a comparatively simple question. What would be the outcome if it were attempted to attack the problem at two points instead of one it is impossible to say. To order a road to run an unremunerative passenger train and at the same time to increase the cost of running it; to order freight rates reduced, while at the same time adding to the cost of running every freight train-mile, would be harder even than the attempts at regulation heretofore made.

A scheme of regulation involving such complications, even when right in itself, should be enforced only through the medium of an intelligent and conservative board of commissioners, such as that which carried its point in the Massachusetts case referred to. As we stated in discussing this subject on March 22, the best of commissions can often do little more than to investigate and give publicity. To perform even this simple office and do it in a way to educate public opinion and not confuse it is a delicate task and one which requires men of the most varied talents and experience. At present commissions of this kind are certainly very scarce in the states of this country. As for the National Commission, it has no technical member whatever. A technical expert, acting under specific instructions from a board, may do good work, and the last report of the Massachusetts commission testifies to the fact; but the desirability of conducting affairs on that plan permanently is questionable, to say the least. At all events, so long as the able legal gentlemen on the Inter-state Commerce Commission have their time filled up with questions which they are specially qualified to deal with, it will be likely to do more harm than good to spread them over a larger field. If national action is to be taken on this matter, it should look to the formation of a board of commissioners selected for their fitness to consider technical points. Such a board might be either independent of the almost exclusively judicial body now existing, or act in conjunction with it; but to make the lawyers wholly responsible for the decision of technical questions would be unwise.

March Accidents.

Our record of train accidents in March, given in this number, includes 38 collisions, 59 derailments and 4 other accidents; a total of 101 accidents, in which 22 persons were killed and 104 injured.

These accidents are classified as follows:

COLLISIONS:	
Rear	26
Butting	11
Crossing and miscellaneous	1
	— 38
DERAILMENTS:	
Broken rail	2
Loose or spread rail	1
Broken bridge or trestle	3
Defective switch	1
Broken wheel	4
Broken axle	3
Broken truck	4
Loose wheel	2
Fall of brake beam	1
Misplaced switch	5
Rail out of repairs	2
Washout	1
Landslide	2
Malicious obstruction	1
Unexplained	27
	— 59
OTHER ACCIDENTS:	
Miscellaneous	4
	— 4
Total number of accidents	101

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	9	..	..	9
Misplaced switch	1	2	..	3
Failure to give or observe signal	2	2	..	4
Mistake in giving or understanding orders	..	3	..	3
Miscellaneous	3	1	..	4
Unexplained	11	3	1	15
Total	26	11	1	38

A general classification shows:

	Collisions.	Derailments.	Other Acc'd'ts.	Total.	P. c.
Defects of road	..	7	1	8	8
Defects of equipment	9	14	1	24	24
Negligence in operating	14	7	1	22	22
Unforeseen obstructions	..	4	1	5	5
Unexplained	15	27	..	42	41
Total	38	59	4	101	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	9	22	2	33	25
Freight and other.	60	37	2	99	75
Total	69	59	4	132	100

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other acc'ds.	Total.	P. c.
Employés	7	11	1	19	86
Passengers	..	..	..	..	..
Others	1	2	..	3	14
Total	8	13	1	22	100
INJURED.					
Employés	27	26	1	54	52
Passengers	6	39	..	45	43
Others	..	5	..	5	5
Total	33	70	1	104	100

The casualties to passengers and employés, when divided according to the classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	..	10	3	2
Defects of equipment	..	1	3	9
Negligence in operating	..	6	7	27
Unforeseen obstructions and maliciousness	..	9	1	..
Unexplained	..	19	5	16
Total	..	45	19	54

Sixteen accidents caused the death of one or more persons, and 31 caused injury but not death, leaving 54 (54 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with March, 1888 and 1887, shows:

	1889.	1888.	1887.
Rear collisions	26	36	20
Butting "	11	26	22
Crossing and other collisions	1	3	3
Derailments	59	99	59
Other accidents	4	8	13
Total "	101	172	117
Employés killed	19	53	32
Others "	3	32	27
Employés injured	54	103	68
Others "	50	108	144
Passenger trains involved	33	75	46
Average per day:			
Accidents	3.26	5.55	3.77
Killed	0.71	2.74	1.90
Injured	3.35	6.79	6.84
Average per accident:			
Killed	0.217	0.500	0.504
Injured	1.029	1.227	1.812

There is no record of any passenger killed this month, and it will be seen that the comparison with previous records is very favorable in all respects. The Blackshear (Ga.), disaster occurred a year ago, and that at Forest Hills, Mass., two years ago, but the differences are still great if we leave those out. All the collisions reported as occurring from "miscellaneous" causes were clearly attributable to negligence. Inquiry concerning certain accidents in this list confirms the view that too fast running is the cause of a large proportion of rear collisions. When a flagman fails to go out, the fact is quite likely to be told of; when he goes but does not go far enough, definite information is hard to get and the blame may be conjectured to lie against either train; but where a train is just starting from a station on time, a train striking it in the rear is convicted without argument. As long as the blame is thus so often attributable to two or more men, "unexplained" will continue to cover a large share of the cases, as at present; for in such circumstances a definite statement can be secured only through some means clothed with authority.

The list of rear collisions again includes a number (four) wherein the rear cars of a train broke away and ran back down a grade, and the aggregate damage done in this way is appreciable. If we may employ a Hibernicism, this kind of accident may be said to result from a failure to stop cars when they are already stopped. A car ascending a grade cannot descend it without giving a first-class opportunity to set the brakes, if there are brakes to set. If, therefore, a superintendent cannot justly find his trainmen negligent, he must find some one else negligent in failing to provide efficient brakes. Wherever the fault may be it is sufficiently disgraceful to warrant energetic curative measures. It may be regarded as fortunate that this sort of mishap has not resulted in a horrible accident; the possibilities are present, as we can learn from the well-known holocaust at Abergele, Wales, in 1868.

Two derailments, injuring 3 persons, one fatally, occurred to trains, whose engines were running backwards. The tender appears to have jumped the track first in each case. While we have no evidence that the fact that the engine was thus running tended to cause the derailment the occurrences serve to remind us of the care necessary in working this way. With the growth of suburban passenger traffic and the increased protection of highway crossings this practice has become a regular thing in many localities. Where grade crossings are few or are well protected and the track in first-class condition, trains can be run in this way at a saving of much labor and time and some cost. The building of an additional turn table may sometimes be avoided. The economy and convenience are so marked that managers are willing to run the risk, which is small, of doing damage or suffering loss from lack of a cow-catcher, for the sake of the convenience. But unless the track *is* strictly first-class, and the engine and tender are both kept in the very best condition, and carefully watched, the risk is greater than might at first appear. A tender is an exceptionally heavy vehicle on a short wheel base, and when derailed while running backwards at high speed is an ugly obstruction in the way of the engine. Besides keeping the wheels and truck frames in perfect order, the loading of the tender should be looked after. With a tank only partly filled with water and with the coal unequally distributed, the lurching of the body when turning sharp curves or making sudden stops, is, of course, more severe than with a full tank and a well balanced load. Runners, therefore, have need for carefulness at this point. There have lately been derailments attributed directly to the improper loading of tenders.

Noteworthy cases this month are the fortunate escape of the New York & Chicago limited on the 4th, and the collision at Seattle the 9th, where a brakeman's lantern was twice extinguished by wind. The "Limited" jumped a gap only two feet long, instead of one of 15, as was reported in the papers, but the occurrence was remarkable, nevertheless. Accidents prevented deserve notice, of course; and mention should be made of the burning of a bridge on the Central of Georgia near Macon March 28. The watchman had two bridges to attend to, and discovered this one when it was too late to put out the fire, or even cross the bridge. The first train due was from the further side, so he had to swim the 100 ft. stream in order to signal it. He stopped the train, and had not much time to spare before he had to swim back again to flag another from the opposite direction.

A derailment which does not appear in our list, but which is of interest to operating and roadway officers, was that of a hand-car carrying four men, near Wallington, N. Y., March 15. The car jumped the track on a trestle, and with the men went down 35 ft., but all came out alive, three of them having fallen into 4 ft. of water.

Canadian accidents, which we do not tabulate, were somewhat numerous in March. A butting collision on the Intercolonial, near Rimouski, Que., on the 19th, killed four men. A freight train had been hindered by snow until it encroached upon the time of an opposing passenger train and neglected to send out any signal whatever. At Paris, Ont., on the Grand Trunk, March 1, a fast running freight ran into the rear of a passenger train standing at the station and killed two passengers. The Mexican National had a bad derailment at Malivata, Mex., on the 23d.

Red Tape.

This expression is generally used in contempt. The neatness and convenience of this article as compared with tow twine, such as post-offices use, and the advantage of having documents well tied up instead of loosely flung around, are overlooked, and the thought turned to the behavior of persons who unnecessarily multiply papers and thus use too much tape, or to those whose habit of assuming too much importance and thus hindering business may be metaphorically referred to as an excess of breadth or brilliancy of color in the tape they use. But as it is the abuse and not the use of a good thing that gives rise to this widespread feeling, we desire to consider for a moment the legitimate uses of some of the business methods that lend expressiveness to the current use of this slang.

A general manager who says that he must refer a bill to the treasurer or auditor before he approves it; a storekeeper who insists on a proper requisition before giving out a feather duster or a cut-glass inkstand; a conductor who is strict in handling freight, recording car seals or demanding passes or tickets from would-be deadheads—all, high or low, who follow a prescribed method of procedure which is at all circuitous, are looked upon with some scorn by nearly every one whose interests are in any degree interfered with thereby. As nearly every one who suffers from or is accused of red-tapeism feels intensely, if at all, concerning the wrongs that he thinks he is suffering from, people are found to generally run to extremes. They are either decidedly particular in doing things according to rule, or else are constantly striving to take the shortest cut to the desired end. It is the golden mean between these two positions that should be the aim of all and that we wish to call attention to. As the majority is always on the side of those who aim to take the "short cut," we will mention an instance or two which go to show the reasonableness of the other view of the question.

In a certain yard a track used for cabooses was so near an adjoining building that a certain style of caboose, of which a dozen new ones were lately put in service, came in contact with the roof of the building and suffered damage. Every one of these cabooses, which was pushed far enough down on the track, encountered the roof and had to go to the shop for about $10 worth of repairs. The first one smashed was reported to the yard master, and he reported the case to the local agent; thus far the routine was all right. But the next report went to the engineer of buildings: and as the offending roof was on a private owner's building, off the company's premises, this officer took little interest in the subject. In the meantime another caboose was put upon that track one dark night and necessitated repair bill No. 2. After a while the local agent reported to the division superintendent. This superintendent happened to be one who meant well, but whose red tape was all of his own make and not very effective; but after two or three attempts, the owner of the troublesome roof was seen and the projection cut off, but not until the third caboose had run against it. Here was a case where several kinds of red tape were needed. First, station agents and yard masters ought to have received written notice when the wide cabooses were put in service. There being but a few of them and the obstruction being near the inner end of a spur track, it is perhaps not to be wondered at that the yardmaster made the blunder of not ordering them kept off that track. The local agent ought to

have known at once what office the report should go to. If he had no authority to negotiate with the owner of the building he should have been able to set the right officer on the track immediately. The officer to whom the report was wrongfully sent should have been drilled in a routine that would have led him to either turn that letter over to the proper official or else send it back to its writer *without any delay*. All concerned should have known when to use the telegraph and when to request a telegraphic acknowledgment of a letter.

The tightening of all these loose screws is a matter which generally is attended to with a fair degree of faithfulness by individual exertion, without special instruction; but what is needed is a well-understood system by which the general manager can feel sure that *all* will do this; that every employé in a responsible position will understand how to meet every emergency, little as well as big. This $30 spent for repairs would have paid for a good many special reports and have allowed for a reasonable share of useless ones. "Red tape" should not always be disused because some of the operations under it seem to be without value.

The lack of an organization fully equal to the demands of the service is often noticeable in the train master's and train dispatcher's offices. Many really efficient officers, whose reputation for good and careful work is excellent, depend a good deal upon personal interviews with their superiors, associates and subordinates for the smooth handling of business, and as a consequence their absence from the post of duty for a day or two upsets things. Orders for movement of cars are neglected, the right men for extra passenger trains are not on hand, and poorer ones have to take the run, telegrams from general officers are answered only after delay, or in a half-satisfactory manner; these, and a great variety of other matters, either suffer, or are made right only after much hurried telegraphing. Those familiar with this class of annoyances would do well to consider whether the habits of the "precise fellows" could not be copied to advantage. A little more attention to records, even if it should seem to waste a little paper; more communication by letter and copying of letters in tissue books, even at the expense of an extra half hour's work occasionally; more explanation to the chief clerk of what is proposed as well as what is doing, even at the risk of putting him "on his dignity" a little too much; changes of this kind often simplify work and enhance harmony in a marked degree.

To place in the dispatcher's chair a telegraph operator who has hardly had a chance to look outside his own office for a year or two and expect him to keep trains moving smoothly without thoughtful aid and support from the train master is absurd; only a prodigy can fill such a place. The train master can, by ordering movements involving extra trains without informing all concerned, or by changing the load or the work of a train and forgetting to tell the dispatcher, neutralize any amount of careful calculation on the part of the latter. And the only sure way to provide against one man's working in ignorance of another's movements in this way is to provide a regular routine; in short, to have a little more red tape. Otherwise subordinates will hesitate to make inquiries because of diffidence (or, after a while, from contempt for a thoughtless superior), and superiors will continue to produce friction among those below them because they do not realize how much of it there is.

These are, of course, not the only departments where hints of this sort are applicable. Ordering cars to the shops to be around in the way and involve extra switching for a day or two before instructions as to the work to be done are received; sending material for new work too early or too late; postponement of the preparation of new tariff notices or time-tables until it is necessary to haunt the printing office nights; these are only instances of well-known irregularities whose existence is largely owing to the lack of carefully studied plans laid down beforehand for the conduct of the business; to the unreasonable contempt for red tape which, in our short-sightedness, we are so proud of.

The action of the New York Central and its allied lines in curtailing Sunday work attracts a good deal of notice, and has apparently led local newspapers to make considerable inquiry amongst railroad managers at various places. There is still much skepticism as to the feasibility of carrying out such a plan in the face of the inexorable laws of competition, and the President of the New York Central has said that the preseut move is somewhat of an experiment. But managers who express opinions are uniformly in favor of the utmost possible improvement in the line indicated. A Buffalo paper states that all the lines centring in that city have followed the example of the New York Central. The Cleveland, Columbus, Cincinnati & Indianapolis has issued the same notice as the New York Central, and the entire Vanderbilt system seems to be a unit in the matter. A Montreal dispatch is to the effect that the Grand Trunk has issued a similar order. The Philadelphia & Reading is said to be willing to enter into an agreement to stop all but perishable and live stock on Sunday provided its competitors will do the same. A number of reports are somewhat indefinite, but at least something in the way of restriction of Sunday business seems to have been determined upon by the following roads: Boston & Albany, Boston & Maine, C., C., C. & I., Delaware & Hudson Canal Co., Delaware, Lackawanna & Western, Grand Trunk, Lake Shore & Michigan Southern, Michigan Central, New York Central & Hudson River, New York, Chicago & St. Louis, New York, Lake Erie & Western, Pennsylvania, Philadelphia & Reading, St. Louis, Iron Mountain & Southern, West Shore. A Cleveland paper states that the Erie system discontinued its ordinary Sunday trains a month ago, but we have seen no other mention of the fact.

A Chicago traffic man, said to be "the General Passenger Agent of a large road, not the Alton," is quoted as giving vent to his soul in the following deliverance. While no names are given, the statement is confirmed by other facts to a sufficient extent to render it worth noting:

"If the whole truth comes out with regard to commission paying when the matter comes up before the Inter-state Commerce Commission the public will hear something surprising. You remember we all signed circular letter 'A,' agreeing not to pay commissions to agents of the trunk lines. Well, we not only continued paying commission to the Eastern agents, but we paid them with the full knowledge and tacit consent of the Eastern roads. With the agents of the Pennsylvania line alone we had to exercise care in commission paying. All the rest we paid in checks in the regular order of business, as we have always done. The Pennsylvania agents we paid in cash through a messenger. This was so well understood that the same messenger performed this service for half a dozen roads, ours included. Except in the case of the Pennsylvania agents there has not even been a change in the manner of commission paying in years. Circular letter 'A' did not lessen the amount of commissions paid by one solitary cent. At the present moment there is as much commission paying as ever. Open confession is good for the soul occasionally, and there has been too much lying and hypocrisy about this commission business."

As we go to press the stockholders of the steel companies of Chicago are sitting in that city to settle the proposed combination of the North Chicago Rolling Mill Co., the Union Steel Co., and the Joliet Steel Co. into one great company to known as the Illinois Steel Co. The plan is said to be to increase the capital stock of the North Chicago Co. to $25,000,000 and purchase the plant of the other companies. This consolidation of interests is expected to result in economy of operation and in a greater variety of products. It appears probable that the new company will consolidate the rail plant, and will develop the manufacture of some new articles in rolling stock and railroad equipment, besides increasing the quantity and variety of structural shapes turned out.

Mr. J. F. Hartt, director of certain roads in the Atchison System, who was severly scalded in his private car in the collision at Loreno, Ill., on April 10, died at the hospital in Chicago last week, making the sixth person to die from that disaster. The coroner's jury has condemned the conductor and engineer of the freight as careless and incompetent, and turned them over to the grand jury. It is stated that the freight train was equipped with the automatic brake, and that the point of collision was 1,250 ft. beyond a switch which was lighted. If this be so, the guilt of the trainmen is unmistakably confirmed and their behavior must have been extremely reckless.

TRADE CATALOGUES.

Special Wood Working Machinery.—Messrs. Greenlee Bros. & Co., of Chicago, issue a descriptive circular of a few special machines of their own design and make. This catalogue contains very fine engravings of 15 machines, such as mortisers, saw tables and cut-off machines, some of which have already been illustrated in the *Railroad Gazette*. With each machine there is a brief description, and quite a novel departure in catalogues of this sort is made by giving plans, with dimensions, of several of the machines, from which may be seen exactly the floor space required. The policy of this house is to make and sell but a few special wood working machines, not attempting to cover the field. It is thought that the result is a perfection in design and workmanship which cannot be attained where a great variety of machines is made.

Light Locomotives.—H. K. Porter & Co., Pittsburgh, Pa. Sixth edition. 1889. This is a combined catalogue and handbook of information, containing descriptions of locomotives manufactured by Messrs. H. K. Porter & Co. Fully one-half of this book of 150 pages is devoted to useful information, most of which is not published in any other form, giving detail performance of light locomotives. The results quoted are taken from actual performances. No other builders of locomotives make such a variety of small locomotives as this company, and this publication illustrates a great variety of uses to which such motors are put. To railroad and mining engineers, as well as to owners and operators of large plantations, steel works and logging districts, this work is of particular value. As a book of reference in matters pertaining to light railroad operation, particularly of narrow gauge railroads, we have found it to contain more information on the subject than any other publication. The sixth edition is considerably enlarged.

The Sperry Electric Company, who are builders of systems for transmission of electrical currents of both high and low pressure, issue a circular describing the advantages of the Sperry safety system, with its lamps, dynamo, and peculiar armature. This armature is remarkable for its simplicity and completeness of ventilation. In addition to a description of their own devices the pamphlet contains information useful to electricians and those making estimates on electrical plants.

Train Accidents in March.

COLLISIONS.

REAR.

1st, on Brunswick & Western, near Brunswick, Ga., passenger train ran into the rear of a freight train, badly damaging the engine and wrecking the caboose and several cars. Two passengers injured.

3d, on New York Central & Hudson River, near Low Point, N. Y., freight train ran into the rear of a preceding freight, doing some damage.

3d, on Delaware & Hudson Canal Co.'s road, near Chazy, N. Y., freight train broke in two and the two sections collided, wrecking seven cars. Brakeman hurt.

4th, at crossing in Atlanta, Ga., a Georgia Pacific yard engine ran into the rear car of an East Tennessee, Virginia & Georgia freight, doing slight damage.

4th, night, on Duluth, South Shore & Atlantic, at Marquette, Mich., as a yard engine was hauling a train of 17 cars of stone up a steep grade, the coupling broke one car from the locomotive and the detached cars ran back down grade uncontrolled at considerable speed and into some cars standing at the end of the track, where the butting-post was knocked down and a number of cars thrown into an adjacent street in a bad wreck. Several buildings in the street were also badly damaged.

4th, on New York, Lake Erie & Western, at Alfred, N.Y., a freight train broke in two and the rear portion collided with the forward one. A car load of naphtha exploded and 18 cars were burned up.

6th, on Buffalo, Rochester & Pittsburgh, near Salamanca, N. Y., a freight train broke in two and the rear section ran back down grade and collided with a following freight, doing slight damage. The stove in the caboose was overturned and started a fire which consumed the car.

6th, on Louisville, New Albany & Chicago, near Putnamville, Ind., freight train descending a grade separated in two places and the detached sections collided, demolishing a number of cars. Conductor was caught in the wreck and killed.

6th, on Central of Georgia, at Augusta, Ga., passenger train ran into some box cars standing on the main track, doing some damage.

9th, night, on Puget Sound Shore Railroad, at Seattle, Wash. Ter., a stock train standing on the main track unloading cattle was run into by a following freight train. The locomotive and caboose were wrecked and a dozen cars derailed and damaged. The lantern of a signalman who was trying to warn the oncoming train, was twice extinguished by high winds.

9th, on Pennsylvania road, near Benfer, Pa., a freight train broke in two and the rear portion collided with a following freight drawn by two engines, which, together with caboose and several cars, were damaged. One trainman killed, 2 trainmen badly hurt.

11th, on Flint & Pere Marquette, near Ludington, Mich., passenger train ran into the rear of a freight train, doing some damage. One trainman injured.

12th, on Chicago & Northwestern, near Indiantown, Mich., a special freight which had stopped at a tank was run into by a work train which came up behind it too fast. Nine cars derailed and caboose burned up.

13th, on East Tennessee, Virginia & Georgia, near Caswell's, Tenn., freight train ran into the rear of a preceding freight; engine derailed and thrown over an embankment.

15th, on St. Paul, Minneapolis & Manitoba, at Howards Lake, Minn., a freight train ran over a misplaced switch and into the rear of another freight standing on a side track, wrecking an engine and 12 cars.

16th, on Pensacola & Atlantic, near Marianna, Fla., an excursion train broke in two, and the detached portions collided, injuring a trainman

16th, on Richmond & Danville, at Clifton, S. C., a freight train approaching a station too rapidly, and ahead of time, ran into the rear of a preceding freight just leaving the station. Engineer, 1 brakeman and a tramp killed, and 3 trainmen injured. The wreck took fire, and 4 cars were burned up.

17th, on East Tennessee, Virginia & Georgia, near East Bluff City, Tenn., a freight train broke in two and the rear section ran back down grade and into the head of a following freight, damaging an engine and 6 cars.

18th, on New York Central & Hudson River, at Tribe's Hill, N. Y., a locomotive ran into a work train, seriously injuring an employé.

19th, on Baltimore & Ohio, at Pittsburgh, Pa., a freight train ran into the rear of another freight, damaging an engine and 12 cars. Fireman injured.

20th, on Richmond & Danville, near Salem Junction, N. C., a freight train ran into the rear of a preceding freight, wrecking an engine and 10 cars. Fireman injured.

21st, on Pittsburgh, Cincinnati & St. Louis, at Oakdale, Pa., a freight train ran into a preceding freight, wrecking an engine and 9 loaded cars. Engineer and fireman slightly hurt.

21st, on New York, Lake Erie & Western, near Cuba, N. Y., a freight train ran into a preceding freight, the engine of which had been disabled. The caboose and one car were thrown from the track over an embankment, where they caught fire and were consumed.

22d, on West Shore, at Fort Hunter, N. Y., west bound express train, No. 57, ran into the rear of a freight train which had broken in two as it was entering a side track. The caboose was completely wrecked and 7 cars derailed. Fireman injured. The freight left a flagman at Amsterdam, 5 miles back, who notified the passenger runner; the latter received a clearance order from the block signal operator. Besides this, a second flagman was sent back when the freight broke in two.

23d, on St. Louis & San Francisco, near Lebanon, Mo., freight train broke in two and the rear section ran into the forward one, wrecking half a dozen cars and derailing several others.

29th, on Atchison, Topeka & Santa Fe, at Morris Station, Kan., freight train ran into the rear of a preceding freight damaging engine and caboose, slightly injuring 2 trainmen.

BUTTING.

1st, about 8 p. m., on Baltimore & Ohio, near Moundsville, W. Va., butting collision between a passenger and a freight train, due to mistake in orders, badly damaging both engines and several cars in each train. A portion of the wreck was thrown over against a trestle of the Ohio River road, parallel at this point, leaving the structure in a precarious condition. Conductor of freight injured.

2d, on New York, Philadelphia & Norfolk, at Oak Hall, Va., butting collision between two freights, badly damaging both engines and several cars. The accident is attributed jointly to a dispatcher's mistake and to an operator falling asleep.

3d, on Delaware & Hudson Canal Co.'s road, at Wells Bridge, N. Y., butting collision between a freight train and a locomotive hauling a caboose, damaging both engines and several cars. Engineer killed. The accident was caused by a dispatcher's mistake.

11th, on Union Pacific, at Evanston, Wyo., the Golden Gate special passenger train ran over a misplaced switch and into the head of a passenger train standing on the side track, badly damaging both engines and several cars. One trainman injured.

17th, on Denver & Rio Grande, near Vallie, Col., a butting collision between a freight train and an empty engine on a curve wrecked both locomotives and derailed several cars.

17th, on International & Great Northern, at Riverside, Tex., butting collision between a freight train and a construction train, killing an engineer.

23d, on Southern Pacific, at Colton, Cal., a freight train ran over a misplaced switch and into a double-header freight damaging 3 engines. Brakeman injured.

25th, on Pennsylvania road, near Bristol, Pa., butting col-

lision between two freight trains, damaging both engines and throwing one tender and a loaded refrigerator car into the ditch.

26th, on East Tennessee, Virginia & Georgia, near Stockbridge, Ga., butting collision between a passenger train and a freight on a curve in a deep cut, due to the latter running on the passenger train's time, making a bad wreck. Engineer of passenger train killed, 5 other trainmen and 4 passengers injured.

28th, on Central Pacific, at Muscatel, Cal., butting collision between two freight trains in a dense fog, wrecking both engines and several cars of each train. Both trains apparently intended pulling by the station and backing on to the side track.

31st, on New York, Pennsylvania & Ohio, near Jamestown, N. Y., butting collision between two freight trains, wrecking 2 engines and 20 cars. Three trainmen injured. Train second 24 should have waited at Lakewood for first and second 81, but it waited only for the first.

CROSSING AND MISCELLANEOUS.

1st, on Cincinnati, Washington & Baltimore, at Cincinnati, O., a passenger train moving backwards in the yards struck and slightly damaged the front end of a locomotive just entering a roundhouse. The rear (sleeping) car was derailed and knocked down a yard-master's shanty.

DERAILMENTS.

DEFECTS OF ROAD.

8th, 6 a. m., on Denver & Rio Grande, near Gunnison, Col., the two rear sleepers of an east-bound passenger train were thrown from the track by a broken rail and upset. Two passengers severely and several slightly injured.

10th, on New York, Lake Erie & Western, near La Salle, N. Y., a bridge gave way under a freight train and several cars went down into a creek.

11th, on Wabash Western, at Liberty Mills, Ind., engine and 3 cars of a freight train were derailed by a defective switch and wrecked.

14th, on Louisville & Nashville, near Stanford, Ky., engine and 2 cars of a freight train broke through a trestle and were wrecked. The engineer saved himself by jumping, but the fireman went down with the engine and was fatally injured. A tramp stealing a ride was also fatally hurt.

15th, 7 a. m., on Denver & Rio Grande, near Salt Lake City, Utah, a passenger train struck a broken rail and the two rear sleepers were derailed, overturned and dragged some distance. Two passengers severely and several others slightly injured.

18th, on Central Pacific, near Delta, Cal., engine of a south-bound passenger train was thrown from the track by the spreading of the rails.

28th, on Wabash Western, near Queen City, Mo., the engine and 3 cars of a passenger train went into the ditch and were badly wrecked at a point where piling had been burned out during the night. Engineer and fireman killed, two other trainmen injured.

DEFECTS OF EQUIPMENT.

1st, on Grand Trunk, at Yarmouth Junction, Me., several cars of switching freight train derailed by a loose wheel.

5th, on Central of New Jersey, at Freemansburg, N. J., baggage car of a passenger train derailed at a curve by a tender wheel which had broken and dropped upon the track. The front truck of the car was thrown over and ran along some distance on the opposite track, while the rear trucks remained in place.

5th, on Central of New Jersey, near Bethlehem, Pa., 3 cars of passenger train derailed by broken axle. One trainman killed and another injured.

6th, on New York Central & Hudson River, at East Albany, N. Y., 4 cars of a freight train were derailed and damaged by a brake-beam dropping upon the track. Brakeman slightly injured.

7th, on Florida Southern, near Lisbon, Fla., a truck gave way under a box-car in an accommodation train and several coaches were overturned in the ditch.

7th, on Louisville & Nashville, near Independence, Ky., caboose and a car of a freight train derailed by a broken axle, wrecking both and injuring 3 trainmen.

7th, on Louisville, New Orleans & Texas Pacific, near Shelby, Miss., 10 cars of a freight train were derailed and ditched by the breaking of a wheel. A carload of lime, being thrown into some water, set the wreck on fire and 8 cars were consumed.

15th, on Central of New Jersey, at Plainfield, N. J., 9 cars of a freight train were derailed by the breaking of a wheel, 3 of them being badly wrecked.

22d, on Rome, Watertown & Ogdensburg, near Theresa, N. Y., a wheel broke under a car in a freight train and several cars were derailed and went over an embankment.

23d, on Philadelphia, Wilmington & Baltimore, near Darby, Pa., 4 cars of a freight train were derailed by the breaking of an axle and rolled down an embankment, killing a valuable horse. A man in charge of horses and 3 tramps injured.

23d, on Cincinnati, New Orleans & Texas Pacific, near Enterprise, Miss., rear truck under tender of a passenger train broke down, derailing the three following cars.

24th, on New York Central & Hudson River, at Fonda, N. Y., 7 cars of a freight train were derailed by a loose wheel under one of them.

26th, on New York Central & Hudson River, near Palmyra, N. Y., a car of a freight train was derailed by a broken truck, knocking down two water columns.

27th, on New York Central & Hudson River, near Schenectady, N. Y., a truck under a car in a freight train broke down, derailing a number of cars, which were thrown over so as to foul the opposite track.

NEGLIGENCE IN OPERATING.

8th, on Boston & Maine, at White River Junction, Vt., a freight train ran over a misplaced switch, and the engine and several cars were thrown into a turn-table pit and wrecked. Fireman killed, engineer badly hurt.

9th, on Delaware, Lackawanna & Western, at Newark, N. J., construction train derailed at a point where rails had been removed for repairs.

11th, on Texas & Pacific, near El Paso, Tex., passenger train ran over a misplaced switch, and the engine, express, mail and 2 passenger cars were overturned and badly damaged. Engineer, fireman and express messenger injured. It is alleged that the switch had been maliciously misplaced.

18th, on East Tennessee, Virginia & Georgia, at the Chattahoochie River, freight train derailed by a misplaced switch.

23d, on Central Pacific, near Madera, Cal., 9 cars of a freight train were derailed and wrecked by a misplaced switch.

23d, on Illinois Central, near Dingola, Ill., engine and 6 cars of a freight train were thrown from the track at a point where track repairs were in progress and the section men failed to display the proper signal.

29th, on Long Island road, at Patchogue, N. Y., passenger train derailed by misplaced switch.

UNFORESEEN OBSTRUCTIONS.

15th, on Central Pacific, near Chico, Cal., the rear car of a passenger train was derailed and overturned at a point where the roadbed had been impaired by heavy rains, severely injuring 6 passengers and bruising several others.

19th, on Baltimore & Ohio, near West Alexander, Pa., all the cars of a passenger were derailed by a fall of rock in a cut which occurred just as the train was passing. No person hurt and no damage to cars or track.

20th, on Central Vermont, near Rockingham, Vt., passenger train struck a boulder which had rolled down upon the track and was partially derailed.

23d, on Georgia Midland & Gulf, at Nebula, Ga., engine and tender of a passenger train were derailed and went over an embankment. Engineer killed and fireman seriously injured. The accident is attributed to malicious loosening of rail fastenings.

UNEXPLAINED.

2d, on Florida Railway & Navigation Co.'s road, at Ocala, Fla., engine of accommodation train derailed.

2d, on Burlington & Missouri River, in Lincoln, Neb., yard engine hauling a train of freight cars was derailed at a switch and overturned. Fireman badly hurt.

5th, on Brunswick & Western, near Waycross, Ga., two rear coaches of passenger train derailed and thrown over an embankment, injuring 4 passengers.

5th, on Brunswick & Western, near Willingham, Ga., freight train derailed. Four cars wrecked.

6th, on New Orleans & Northeastern, near New Orleans, La., freight train derailed, wrecking 6 cars. Several trainmen slightly hurt.

7th, on Hot Springs Railroad, near Hot Springs, Ark., smoking car of a passenger train derailed and overturned in the ditch, injuring 3 passengers.

7th, on St. Louis, Iron Mountain & Southern, in St. Louis, Mo., yard engine hauling passenger train derailed and overturned, killing fireman and injuring engineer.

6th, on New York, Lake Erie & Western, at Warsaw, N. Y., 5 cars of a freight train were derailed, tearing away a freight house platform.

7th, on Cleveland & Canton, near Coshocton, O., passenger train derailed and ditched, slightly injuring about a dozen passengers.

8th, on Brunswick & Western, near Albany, Ga., freight train derailed and partially wrecked. Two trainmen injured.

10th, on Philadelphia & Reading, near St. Nicholas, Pa., the forward engine of a freight train, which had an engine at the rear, was derailed while descending a heavy grade and, together with 10 cars, was badly wrecked. Two trainmen killed, two injured.

13th, on New York Central & Hudson River, at Palmyra, N. Y., locomotive of a freight train derailed.

14th, on St. Johnsbury & Lake Champlain, at Wolcott, Vt., freight train derailed, six cars being thrown into a river.

14th, on Central of Georgia, near Beaufort, Ga., 8 cars of a freight train derailed and badly damaged.

14th, on Atlantic & Pacific, at Fairview, Arizona, freight train derailed at a curve, the engine and 15 cars being piled up at the foot of an embankment in a bad wreck. Engineer, fireman and a brakeman injured, the latter fatally.

15th, on Southern Pacific, near Long's Station, Cal., freight train derailed on a bridge. Brakeman injured.

15th, on New York & New England, near Unionville, Mass., the engine and tender of a passenger train were derailed while running at considerable speed, tender first. Fireman injured.

16th, on Delaware, Lackawanna & Western, at Newark, N. J., a box car in a switching freight was derailed and thrown over against a moving passenger train on an adjoining track, damaging several cars.

17th, on East Tennessee, Virginia & Georgia, at Mascott, Tenn., locomotive derailed.

19th, on Pennsylvania, at Bessemer Station, Pa., 6 cars of a freight train were derailed and thrown over against some freight cars standing on an adjoining side track, doing considerable damage. Brakeman injured.

19th, on Augusta & Knoxville, near Woodlawn, S. C., freight train derailed on a trestle. Several cars broke through the structure and one trainman was hurt.

21st, on New York, New Haven & Hartford, at Easthampton, Mass., a car of a freight train derailed at a switch.

22d, on New York & Brooklyn Bridge Railroad, at the New York terminus, car of empty switching passenger train partially derailed.

23d, on Buffalo, Rochester & Pittsburgh, near Titus Hill, N. Y., several cars of a freight train were derailed and wrecked. Of 5 tramps in one of the demolished cars, one was instantly killed, another badly injured, and 3 escaped with slight scratches.

23d, on St. Louis & San Francisco, near Neodesha, Kan., 9 cars of a freight train derailed and wrecked.

26th, on Long Island road, near Ridgewood Station, N. Y., passenger train derailed.

27th, on St. Louis & San Francisco, near Claremore, I. T., the tender of engine of a freight train jumped the track while running tender first and the locomotive was derailed and overturned in the ditch, killing the engineer and badly scalding the fireman.

OTHER ACCIDENTS.

4th, on Pennsylvania road, at Birmingham, Pa., the engine of east-bound New York and Chicago limited express broke a frog as it was passing over it at about 35 miles an hour and knocked out about two feet of the rail. The whole train, however, went over the gap in safety, no damage being done except the breaking of pedestals.

14th, on Cleveland, Canton & Southern, near Navarre, O., a steel rail, one end of which had fallen from a car of a construction train and stuck in the ground, was driven through the upper part of the caboose, seriously injuring a trainman. A frightened employé leaped from the caboose, and was fatally injured.

14th, on Central of Georgia, near Beaufort, Ga., engine of passenger train disabled by the breaking of a driving-wheel spring.

27th, on New York Central & Hudson River, near Schenectady, N. Y., an east-bound freight train ran into the wreck of a west-bound freight, which had been thrown over from the opposite track, damaging the engine.

A summary will be found in another column.

A French Vestibule Car.

Some cars of a novel type have recently been put in service on the Northern railroad of France, intended for local traffic, especially during the exposition. The cars were designed to fulfil the following conditions: 1. To have the minimum attainable weight per passenger; 2. to allow free passage for the conductor throughout the car and to the locomotive; 3. to afford facilities for the conductor to collect tickets and call the names of stations; 4. To have a car of large capacity, wherein the number of seats for each class of passengers shall be proportioned to the average demand, viz.: From 8 to 10 per cent. first class seats, from 20 to 25 per cent. second class seats, and the rest third class seats. 5. To provide a separate entrance for each class of passengers, and to have a single entrance for all classes, to be used when stops are made at other points than regular stations. 6. To construct the car so that there can be reserved, when necessary, a compartment for the mail and another for baggage, in case this special car should make part of an ordinary train. 7. To give such flexibility to the car, that it may readily pass curves having a radius of 328 ft.

Each car constructed in accordance with the foregoing condition by Mr. Bricogne, Superintendent of the car shops of the Northern Railroad, has a central passage, two large platforms at the end, and a central platform separating the third class from the first and second classes. The car is composed of three connected sections, each supported on four wheels, as if there were three independent cars; but internally, the three sections are in communication and form a single car with 102 seats, besides a compartment for the mail, and another for the conductor which can be used as a baggage car when necessary. When the mail and baggage compartments are not needed for these special purposes, the car contains 132 seats. These 102 or 132 seats are divided into 12 first-class seats, 20 second class and 70 or 100 third class.

The car weighs 5 5,450 lbs., or 543 lbs. for each seat; it is 82 ft. in length, and is provided with a central passage, which is entered from three platforms having steps at the side; the platforms at the extremities have railings, and a central gate for the exclusive use of the conductor when he desires to go from the car to the locomotive. The intermediate platform between the first and third-class compartments is closed by two glass doors composed of jointed leaves, which causes the doors to conform to the undulations produced in passing curves.

Each compartment is separated from that of the next class by a glass door. At night the car is lighted by 13 lamps, of which 10 are in the compartments and 3 over the platforms; but arrangements are being made to introduce incandescent lights, fed by a storage battery placed under the car-body.

The manner in which the three sections of the car are joined together is the most original feature of this new design. They are hinged in such fashion that each section can turn to either side without permitting the entrance of rain, snow, cinders or dust, and without materially changing the external appearance of the car body. The sections are closely joined, on the floor of the connecting platforms, by sheets of iron which slide one upon the other; and on the sides of the platforms, by panels jointed like an accordion, so that the car can pass over curves with the connecting parts in perfect contact with the car-body. Internally, the connecting parts between the sections are finished to correspond with the interior of the car, so that a person can pass from one section to another without noticing the change.

The car, which is 82 ft. long, can in a few minutes be separated into three sections (two having a length each of 28 ft. and one of 26 ft.), which can easily be run into a shop for repairs.

There are three brakes, two of them continuous, and connected with the locomotive, one a vacuum-brake, and the other operated by compressed air; the third being a hand-brake, under the control of the conductor. By this arrangement, the car is rendered suitable for attachment to any passenger train on the French railroads.

TECHNICAL.

Locomotive Building.

The Union Pacific has let contracts for the construction of nine locomotives to the Schenectady Locomotive Works, of Schenectady, N. Y.; and of twelve locomotives to the New York Locomotive Works.

Car Notes.

The Scarritt Car Chair Works, of St. Louis, Mo., have recently completed some very handsome chairs for the Wagner Palace Car Co., embodying some recent improvements. The Scarritt reclining car chairs are being used by the most prominent roads in the country, including the Chicago, Burlington & Quincy and the Chicago, Milwaukee & St. Paul. A large order is now being completed for the former road. The company is now negotiating for placing some of its seats and chairs on New Zealand roads. Over 50 different patterns of chairs and seats are made by the company.

The United States Rolling Stock Co. has been awarded the contract for building the 200 box and 300 flat cars for the Georgia Southern & Florida road. The order for 300 coal cars which the Central of Georgia recently placed with the company, is being filled at the shops at Hegewisch, Ill. Of the 700 ventilated fruit cars for the same road, half are being built at the Anniston shops and half at the New Decatur shops.

The company is also building at the Hegewisch shops 23 cars for passenger service, for the Alabama Midland. Eight of these are first-class, six are second-class, 4 combination baggage and passenger, and 5 baggage, mail and express. The order is nearly ready for delivery. At the same works, 150 ore cars for the Milwaukee & Northern are nearing completion.

The Kansas City, Wyandotte & Northwestern is in the market for 100 freight cars.

The Missouri Pacific has placed an order for 500 freight cars with the Missouri Car & Foundry Co. An order for a similar number has just been placed with the St. Charles Car Co.

The Litchfield Car & Machine Co., Litchfield, Ill., has received an order for 500 box cars from the Texas & Pacific.

The San Antonio & Aransas Pass is about to contract for 1,000 cars and 25 locomotives.

The New York, Ontario & Western is asking bids for a lot of new cars.

The Pullman Palace Car Company is building seven passenger cars for the Ilwaco & Shoalwater road, of Oregon.

The Union Pacific has awarded a contract to build 100 stock cars to the Muskegon Car Co., of Muskegon, Mich.

Bridge Notes.

Shailer & Schniglau, of Chicago, have been awarded the contract for a railroad bridge in Canada, consisting of one draw span of 200 ft., and two fixed spans 90 ft. each.

The West Pineville Land Co. has closed a contract with the King Iron Bridge Co., of Cleveland, Ohio, for an iron bridge to cross the river at West Pineville, Ky., the bridge to be completed by Aug. 1.

The Mexican Central has recently completed an English through bridge, with 150 ft. span over the Rio Salto, at Santa Rosa, on the Tampico division. On the same division an American through bridge, with a 180 ft. span, has been erected across the Rio Gallinas.

Sealed proposals will be received until May 22 for constructing a plate girder bridge over the Kenduskeag Stream for the City of Bangor, Me.

Bids were opened at Columbus, O., April 23, for the construction of the iron superstructure of the proposed bridge over the railroad tracks at Buckeye street. There were ten bidders. The prices bid ranged from $98,500 to $177,410.

There were five bids received for constructing an iron bridge at Abbott's Corners' Road, over Buffalo River by the City Engineer of Buffalo, N. Y. For the bridge at Severs street, there were also five bids. The former bridge is 90 ft. between the centre piers and the latter is 160 ft.

The county commissioners have extended the time for receiving bids for building the iron bridge across the Tennessee River at Chattanooga, Tenn., until June 1.

Manufacturing and Business.

Mr. T. W. Snow, formerly special agent of the Pennsylvania Steel Co., has been appointed sales agent of the United States Wind Engine & Pump Co., of Batavia, Ill.

Williams, White & Co. are building to order for one of the large western roads a drop hammer, to be used on the construction of a rail joint. The hammer and the die weigh 2,500 lbs., and the machine complete, 30,000 lbs.

Harris Bros., of the Minneapolis Steam Forge & Bolt Works, now have their works in operation. The firm manufactures machine and car bolts and wrought-iron washers, and also the improved solid end switch bar. The National Machinery Co., of Tiffin, Ohio, furnished much of the machinery.

The bridge works of C. J. Shultz, at Pittsburgh, has been awarded the contract for the iron work on the Pennsylvania's new shops at Altoona, Pa.

The Putnam Machine Co., of Fitchburg, is now building eight 56-inch lathes for the Washington Navy Yard. This company is equipping a room for the manufacture of universal milling machines.

The Armington & Sims Engine Co., Providence, R. I., will build another addition to its extensive works, and will add a room for testing and experimental purposes. The company will furnish concrete foundations, covered with cast iron floor plates for the engines and dynamos. Condenser, friction brakes, dynamo meter and counter shafting will be provided, and tests for efficiency of boilers, engines and dynamos can be made.

The Krietch Car-Box Mfg. Co., has been organized at Port Townsend, W. T., to manufacture car journal bearings by a patent process. The officers are: President, A. A. Plummer; Vice-President, L. B. Hastings; Treasurer, James Jones; Secretary, J. F. McIntyre; Superintendent, Jacob Krietch.

Iron and Steel.

The National Forge & Iron Co., of Chicago, has arranged to build works at East Chicago, Ind., where it has secured a tract of 12 acres, with excellent facilities for rail and water transportation. The proposed location at Burnside has been abandoned.

The Standard Iron Co., of Bridgeport, O., is erecting a large building for the purpose of taking care of its increased corrugating business, which has grown too large for the present accommodations.

The new steel plant at Latrobe, Pa., for the manufacture of tires for locomotive driving wheels, is about completed and will be started up soon. The works will furnish employment to about 150 men.

The plant of the Warren Tube Co., at Warren, O., which originally cost about $150,000, has been sold at sheriff's sale to O. C. Barber, of Akron, O., for $35,000. It is reported that Mr. Barber represented the majority of the original stockholders, and the works are now practically in the hands of the builders. It is also stated that the plant will soon be put in operation.

The assignee of the Reading Iron Works has issued orders to start up the large pipe mill of the company on May 5, for the purpose of finishing a large quantity of pipe which was under process of manufacture at the time of the suspension of the company. This work will require three weeks' time. The two large blast furnaces of the works, which have been in operation since the failure, will go permanently out of blast during the coming week. The assignee will commence disposing of the property in a few weeks.

The Joliet Steel Co. has removed its New York office from 11 Pine street to the Bank of America Building, corner Wall and William streets, where all communications should be addressed.

The Rail Market.

Steel Rails.—There are a few southern inquiries still in the market, and an order for 2,000 tons was this week placed with a Pittsburgh mill. An eastern mill has secured an order for 2,500 tons at private terms. The market is unsettled, with quotations at $27@$27.50 in New York, $30@$30.50 in Chicago, and $26@$27 in Pittsburgh, and the Pittsburgh mills are competing strongly.

Old Rails.—Quotations are: in New York, $22.50@$23; in Pittsburgh old steel rails have been sold at $17.25 and $19.50 for different lengths, and old iron rails are quoted nominally at $22.50. In Chicago old iron rails are held at $20 with $19 bid.

Master Car-Builders' Association.

The office of Secretary of this association has been accepted by Mr. John W. Cloud. His address will remain Buffalo, N. Y.

Calibering Solid Drawn Tubes.

In manufacturing solid drawn tubing, especially where the thickness of the walls is comparatively slight, it is found that the diameter of some lengths of the tubing is smaller than the end diameters. In order to rectify this a recent German patent specifies the use of a sufficiently long and perfectly cylindrical mandrel of a diameter corresponding to the largest diameter of the drawn tube, and provided at one end with means of suspending it. The larger end of the tube is fitted to the upper end of the vertically suspended mandrel and the whole is heated. The tube expanding, slips down over the mandrel in virtue of its own weight and falls off, the diameter then being uniform throughout the length. The mandrel, of course, also expands under the influence of the heat, but less rapidly. The same end is accomplished if the heated tube be firmly held by suitable means, and the mandrel be drawn through it.

Nails from Tin Scrap.

At the New York meeting, Feb., 1889, of the American Institute of Mining Engineers, Mr. Oberlin Smith read a brief paper on a process of making nails from tin scrap. He said in substance:

It may surprise the learned metallurgists who read this paper to learn that, by a recent discovery, nails of good quality can be made at one operation, directly from the ore, at the rate of say 60 per minute for each operator. The raw material is found, in strata of various thickness, in Harlem, N. Y., and other localities where the débris from restaurants and from sheet-metal factories of various kinds has been dumped. It is old and new tin-scrap—one of the few substances which this generation, mainly occupied in exhausting the accumulated resources of the past, seems to have laid up, by way of atonement, for the benefit of posterity. The many attempts which have been made to utilize this material have failed, either technically or commercially. The reasons for such failure need not here be discussed. Meanwhile the great tin-scrap deposits have gone on growing faster than any other strata of our post-tertiary psychical era; given up by metallurgists, not yet attacked by geologists, and explored only by that mining engineer of the transitional period, Gulielmus Caper. Before leaving these heaps of tin-scrap, however, to become mere mineral deposits for future ages, it may be well to consider a novel plan for their immediate utilization. I refer to the manufacture, by mechanical pressure, of nails.

This nail was invented, in its original shape, by Mr. Geo. H. Perkins, of Philadelphia, and has been developed, through various forms, until it has almost reached a commercial stage—the machine in which it is to be made, in marketable shape, being nearly completed. The first scheme tried was to cut "blanks" from ordinary tin-plate and sheet-iron scrap, of an approximately rectangular form, about ¾ in. wide by 1¾ in. long. This was done. By a second operation it was corrugated into another press, with a special automatic die, which corrugated the middle grooves first and the side grooves afterwards; much of the metal used not proving strong enough to stand the friction of being pulled into the corrugations of the die without cracking. At a third operation, the embryo nail was crushed together, something after the manner of closing an accordion bellows. These headless nails were then fed by hand into a revolving dial, to carry them under a heading mechanism, after the operation of which they were ejected from the machine automatically.

Obviously, this series of separate operations made the nails far too expensive for the market; and, moreover, some trouble occurred from their splitting in the tightly folded corrugations. We afterwards built an *automatic* machine which performed all the above operations in succession, delivering a complete nail at each stroke. It was, however, far too complicated for practical use, and simply served to show what could *not* be done. Our second nail-machine proper, constructed to receive blanks, which had been already cut in an ordinary press, worked fairly well. Instead of working upon the principle of regular corrugations, it simply crushed up the blanks edgewise into any form which they chose to assume.

The machine now under construction has been very much simplified and made enormously strong and heavy. It is adapted to cutting, crushing, griping and heading the nails at one operation, and can be run as fast as an expert operator can feed the material. Its feed probably varies, with jagged, irregular scrap, from thirty to ninety nails per minute, although straight strips of sheet metal can easily be fed by hand into a machine running as high as 240 strokes per minute.

During the course of our experiments, various forms of nails have been tried. Among others were straight cylindrical nails with conical points; straight square nails with pyramidal and with wedge-shaped points; hexagonal nails, etc. The most practical form, however, seems to be the square taper nail, which has about the same shape as the ordinary cut nail, but is somewhat stronger and a good deal tougher. It is well adapted for all ordinary purposes, but is especially suitable for a roofing nail, since the tin coating prevents much rusting, and is good to solder to.

The economy of this system of nail making is obvious. The scrap can be bought for about seventeen cents per 100 lbs., and a boy can make perhaps 100 lbs. of nails per day. The most economical system of manufacture will be to run one or more nail machines at each large tin shop, set as close as possible to the presses which produce the scrap, so as to avoid the expense of unnecessary handling, and the extra tangling-up incident thereto.

American Exhibits at Paris.

The exhibit of William Sellers & Co. at the Paris Exposition will include one 36 × 36 in. planing machine, to plane 8 ft. long; one 20 × 20 in. planing maching, to plane 5 ft. long; one patent tool grinding and shaping machine, one patent drill grinding and pointing machine, one 45 in. vertical drill press, and also several sizes of the new self-acting injector of 1887, and shaftings, pulleys, hangers and couplings.

Messrs. J. A. Fay & Co., of Cincinnati, will make, at the Paris Exposition, the largest exhibit of wood-working machinery that they have ever displayed anywhere. Mr. W. H. Doane, the President of the company, will have the exhibit in charge, and three mechanics will go to Paris with him to show the machines in practical operation. This exhibit will occupy a space of about 40 by 80 ft., and comprises some 26 machines. Some new designs will be shown that have never been exhibited in this country, as well as improvements in the standard machines made by the company. The following is a list of the machines that will be sent: "D," universal wood worker; No. 2, band saw; large automatic hollow chisel borer and mortiser; No. 6, scroll saw; small automatic hollow chisel mortiser and borer; No. 4, large variety wood worker; No. 2, automatic railway cut-off saw; No. 2½, medium double-belted surfacer; miter and bevel rip saw table; cabinet double saw table; three-spindle vertical car boring machine; No. 3, variety wood worker; strifler's double cut-off saw; No. 1, 16-in. automatic dovetailer; automatic knife grinder; No. 5, band re-sawing machine; No. 4½, cabinet surfacer, 26 in.; No. 2, self-feed rip saw table; No. 3, molding machine; No. 8, six-roll double cylinder lightning floorer; vertical cutting off saw and gaining machine; No. 5, universal car tenoning and gaining machine, new style; No. 3 double drum power feed sand papering machine; No. 3 medium tenoning machine; four spindle horizontal car boring machine; band saw setting and filing machine.

Revision of the M. C. B. Rules of Interchange.

At a meeting of the Arbitration Committee of the Master Car Builders' Association, held in Chicago, April 24 and 25, it was resolved to ask various railroad clubs to offer suggestions relative to amendments to, or changes in, the Rules of Interchange. The committee accordingly asks such suggestions from the clubs, and will be glad to receive suggestions also from the individual members of the Association. This is in accordance with the provisions of Rule 30 of the code, which requires the Arbitration Committee to ask from members of the asssociation, by circular, suggestions of changes, amendments and additions, and makes it the duty of that committee to revise and formulate the replies for presentation to the Association. As the time of the meeting of the Association is close the committee asks prompt attention to this matter. All communications should be sent to Mr. F. D. Casanave, Chairman, Fort Wayne, Ind.

Long's Truss Rail Joint Co.

The business of this company will not be interrupted by the death of Col. Richard Long, who was recently killed by a train at Pittsburgh. Orders already in hand or hereafter received will be promptly filled. At a special meeting held at the office of the President, W. S. Brewster (5 Grand Pacific Hotel, Chicago), that gentleman was authorized to conduct the business according to his judgment. Appropriate resolutions of regret at Col. Long's death were also passed.

Thomson's Rail Joint.

The joint invented by Mr. M. W. Thomson, Engineer Maintenance of Way, Pennsylvania Railroad Division, Pennsylvania Railroad, was shown in the *Railroad Gazette*, May 18, 1888. It is of the type of joint which supports the rail from the base. This joint is in two pieces, each 20 in. long, to reach over two ties. These pieces clasp the flange of the rail closely, both on top and bottom, and give very large bearing surfaces. Vertical webs extend up on either side, but do not come in contact with the web or head of the rail. There are two bolts through these webs, one for each rail. It is expected that the spring of the webs will keep the nuts tight. The two plates can be drawn together by the bolts to take up any slack due to wear and also can be applied to rail sections of considerable range of weight. One pattern of joint can be applied to rails of from 56 to 75 lbs. per yard. As applied on the Pennsylvania the joint weighs 80 lbs. At the time we described this joint, last May, it had been applied for trial on two miles of the track of the Pennsylvania, and an order for joints for one mile of track had just been rolled for the Chicago & Northwestern. We learn now that the Cambria Iron Company has within a few days closed a contract with the Chicago & Northwestern for 20,000 joints, or about 57 miles of single track. Other trials have also resulted in increased orders.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

A statute of New York authorized the extension of the New York & Oswego Midland from the city of Auburn, "or from any point on said road easterly or southerly from said city, upon such route and location, and through such counties as the board of directors of said company shall deem most feasible and favorable for the construction of said railroad, to any point on Lake Erie or the Niagara River." Authority was also given for the issuance of aid bonds by "any town, village or city in any county through or near which said railroad or its branches may be located." The Supreme Court of the United States rules that, before any such bonds could be issued, the company must have adopted an entire route and designated all the counties through which the road was to pass.[1]

In New York a railroad lease provided that the lessor would issue its bonds or stock for the payment of all work which the lessee might desire to have done, "the cost of which is chargeable to construction account." When the lease was made, there was a trestle at one point of the road, which the lessee subsequently filled with an embankment, and the lessor issued its bond for the cost. The Supreme Court holds that such filling was not in the nature of repairs by the lessee, but was the construction of a portion of the lessor's road.[2]

The Supreme Court of the United States decides that the statute of Iowa, which provides that any railroad that fails to fence its road, where the right to fence exists, shall be liable for the value of stock killed or injured by reason of the want of such fence, unless it was caused by the wilful act of the owner; and that if the company neglects to pay within 30 days after notice the owner may recover double the value, is constitutional.[3]

In New York the Court of Appeals rules that where a statute has conferred upon a railroad company the power to lease its railroad to another company, a contract for such leasing is within the original powers of the board of directors, without the concurrence of the stockholders; and the fact that in such case the consent of the stockholders is first obtained by the directors does not make the stockholders parties to the contract.[4]

In Indiana the Supreme Court holds that where two railroad companies whose tracks cross each other agree upon a code of signals, the company breaking that contract is liable in damages for such breach to the other company.[5]

In Pennsylvania the Supreme Court rules that a railroad company cannot be required under the laws of Pennsylvania, to construct a bridge across a deep cut to enable the owner of the land the more easily to reach the highway.[6]

Carriage of Goods and Injuries to Property.

In New York the Supreme Court rules that where a carrier is employed to carry a parcel of clothes, with instructions to bring back the goods if they are not paid for, and the person to whom they are sent retains a portion of the goods, and returns the others, sending a check for those retained, the sender cannot refuse to receive the goods returned, and the check, and sue the carrier for the value of the whole parcel, or for damages, where it does not appear that the check was not for the full value of the goods retained.[7]

In Wisconsin by a bill of lading goods shipped at Milwaukee by defendant railroad company were receipted for as follows: "Shipped by R. P. & Co. the following articles, in good order, to be delivered in like good order, as addressed, without unnecessary delay." "Consigned to H. & K., Onekama, Mich." The Supreme Court holds that this was a contract to carry the goods through to Onekama, there being nothing in the instrument limiting defendant's liability to its own route.[8]

The Supreme Court of Texas decrees that under the state statute providing that a carrier's liability continues until delivery, but that if he uses due diligence to notify the consignee, who does not take the goods, and they have to be stored, the carrier is liable only as warehouseman, a railroad company remains liable as a common carrier for goods not discharged from its car, though a third person has agreed with the consignee to unload them, and the car is at the place of discharge; there being no agreement by the consignee to receive the goods on the car, and no notice, or diligence to give notice, of the arrival of the car at that place.[9]

In Indiana the Supreme Court rules that one who has taken no steps to prevent the location and construction of a railroad on the street in front of his lot, cannot, after the road has been fully completed and put in operation, eject the company from the street, but is confined to his action for damages.[10]

In Iowa immediately on the passing of a train, before it was out of sight, a small fire was seen 150 ft. from the track; it spread rapidly in the direction of plaintiff's hay, which was soon burned. No one was seen in the vicinity of the place where the fire started. The Supreme Court holds the railroad liable for the damage.[11]

Injuries to Passengers, Employes, and Strangers.

In Texas a man flagged a train at a flag station. The train did not stop, though the signal was seen, but as it passed the conductor seized a coat that was upon his arm and told him to jump or, in attempting to do which he was injured. He testified that he did not know how fast the train was running, but thought he could safely board it. The Supreme Court holds the company liable.[12]

A Wisconsin statute requires a railroad company, upon application at its ticket station, and payment of the price, to sell round-trip tickets. Plaintiff purchased such a ticket on defendant's road from E. to W. and return, one part of which was marked, "R. T. Going. E. to W.," and the other, "R. T. Returning W. to E.:" both parts being similarly numbered. On the first parts were the words "Not good for passage" on a line with the words "if detached," on the second part. The two parts of the ticket became detached without plaintiff's fault, and were both presented, on the trip from E. to W., to the conductor, who refused to receive them and ejected plaintiff. The Supreme Court holds that this was unauthorized and the company is liable in damages.[13]

In Michigan the Supreme Court rules that a railroad which provides proper and safe means of egress from its depot platforms to the public highway is not liable to one who seeks to attain the highway by way of the railroad track, and is injured by falling into a cattle-guard.[14]

In California the Federal Court holds that the U. S. statute respecting the number of passengers that may lawfully be carried by a passenger steamer have no application to a ferry boat, though temporarily employed as an excursion boat.[15]

In Pennsylvania the Supreme Court decides that the traveling public have the right to stop and receive their baggage at any regular station or stopping place for the train on which they may be traveling, and any regulation that deprives them of that right is neces-arily arbitrary, unreasonable, and illegal. Therefore, a rule of the company by which, although a passenger may himself get off at a regular station or stopping place of a passenger train, which is just across the street from the station of another railroad, he will not be sold a ticket to that place, or his baggage checked to or delivered at that station, but will be compelled to pay for a ticket to another station a mile distant, and go there for his baggage, is unreasonable and invalid.[16]

In Massachusetts the Supreme Judicial Court holds that where a train stops before crossing the track of another road, where there is no depot, but where the company allows passengers to take trains, one who enters the train there becomes a passenger after entering the car; and his rights and duties are the same as those of other passengers.[17]

The Supreme Court of Pennsylvania holds that a passenger who, on leaving the train at a place where passengers are received and discharged without station or platform, gets off on the track side, instead of getting off on the side where passengers usually alight, is properly non-suited, in an action for injuries received by a passing train, though he testifies that the track side was the leveler surface and the easier place to alight; it not appearing that the other side was dangerous.[18]

In Massachusetts a passenger on a train, which was running rapidly at night on a road of frequent and sharp curves, who was last noticed alive while he was passing through a car in which there were vacant seats, about midway of the train, saying or doing nothing to indicate where on the train he was going, or the purpose of going, was found dead the next morning, lying on the track between the rails, his body being in a mutilated condition, at or near the place of a sharp curve in the road. There was at the time a saloon car hitched to the rear of the train, not annexed for the use of passengers, but presumably to be transported to a station on the road. The passenger cars were connected closely with one another, but the saloon car was attached to the train in such a manner as to leave an open space between it and the preceding car 18 inches wide. The Supreme Judicial Court decides that the company is not liable to indictment for negligence.[19]

In New York a boy, 13 years of age, jumped upon a moving train, from which he was caused to fall and be injured by an employé throwing water in his face while the train was in motion. A verdict against the company is affirmed by the Supreme Court.[20]

In Colorado the Federal Court rules, contrary to a number of decisions in the courts of other states, and contrary to the ruling of Judge Brewer's predecessor, Judge McCrary—that in an action of an employé against a master for an injury caused by the negligence of another employé, it is not enough that the one whose negligence caused the injury was a superior servant and the injured one was subordinate to him, and subject to his orders, but that it is necessary, not merely that there should be subordination, but that the party in control should have such a departmental control—such an extended authority—that the court may justly say that he represents the principal, that he is a vice-principal, as the general superintendent, the superintendent of a division, superintendent of roads and bridges or any party who has a department under his control.[21]

In Georgia a man who was an experienced well digger was employed by a railroad to clean out a well, and the rope furnished him to enable him to descend into it was examined carefully both by him and defendant's overseer, and pronounced a good one, and sufficient for the purpose for which it was to be used. The Supreme Court holds that he cannot recover for injuries caused by the breaking of the rope.[22]

The Supreme Court of Dakota rules that a section foreman and a train conductor are fellow servants;[23] and the Supreme Court of Missouri that the engineer and fireman of a passenger train are *not* fellow servants with a section hand.[24]

In Indiana, a railroad had constructed its line upon a highway, and had dug an excavation therein, and piled the dirt along the sides thereof, making embankments 9 ft. high for a distance of 150 yards, leaving no way for persons to pass, except upon the embankments, with the track between; plaintiff was, while lawfully riding along the highway, thrown from her horse and injured, on account of defendant's neglect to restore the highway to its former state, and on account of the neglect of defendant's servants, after seeing her situation, to stop the hand car to prevent her horse from becoming frightened. The Supreme Court rules that this shows a cause of action against the railroad.[25]

[1] Purdy v. Lansing, 9 S. C. Rep., 172.
[2] Miller v. N. Y., L. & W. R. Co., 3 N. Y. (Supp.), 245.
[3] Minn. & St. L. R. Co. v. Beckwith, 9 Sup. Ct. Rep., 207.
[4] Beneridj v. N. Y. El. R. Co., 19 N. E. Rep., 489.
[5] N. Y. C. & St. L. v. G. R. & I., 18 N. E. Rep., 182.
[6] Traut v. N. Y., etc., 15 Atl. Rep., 678.
[7] Fecher v. M. D. T. Co., 3 N. Y. (Supp.), 116.
[8] Hanson v. F. & P. M. R. Co., 41 N. W. Rep., 529.
[9] Mo. Pac. R. Co. v. Haynes, 10 S. W. Rep., 398.
[10] L., N. A. & C. R. Co., v. Soltmeddle, 19 N. E. Rep., 111.
[11] Hoffman v. C., M. & St. P. R. Co., 41 N. W. Rep., 301.
[12] Kas. & G. S. L. R. Co. v. Dorough, 10 S. W. Rep., 711.
[13] Wightman, v. C. & N. W. R. Co., 40 N. W. Rep., 691.
[14] Sturgis v. D., G. H. & M. R. Co., 40 N. W. Rep., 914.
[15] Schmerin v. N. P. R. Co., 36 Fed. Rep., 710.
[16] P. C. & St. L. R. Co. vs. Lyon, 23 W. N. C., 69.
[17] Deurie v. B. & M. R. C., 19 N. E. Rep., 523.
[18] Morgan v. Camden & Atl. R. Co., 16 A. H Rep., 353.
[19] State v. Maine Cent. R. Co., 16 Atl. Rep., 368.
[20] Clark v. N. Y., L. E. & W. R. Co., 3 N. Y. (Supp.), 607.
[21] Mealman v. M. P. R. Co., 37 Fed. Rep., 189.
[22] Reid vs. Cent. R. & B. Co., 8 S. E. Rep., 629.
[23] Elliott vs. C. M. & St. P. R. Co., 41 N. W. Rep., 758
[24] Sullivan v. Mo. Pac. R. Co., 10 S. W. Rep., 852,
[25] Evansville & T. H. R. Co. v. Crest, 19 N. E. Rep., 310.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

New Securities Listed.

The Governing Committee of the New York Stock Exchange has listed the following railroad securities:

Atchison Colorado & Pacific.—$398,000 first mortgage bonds, making the total amount listed $4,070,000.

Atlantic & Danville.—$2,632,000 first mortgage 6 per cent. bonds.

Denver, South Park & Pacific.—Engraved trust receipts for first mortgage 7 per cent. bonds.

Milwaukee, Lake Shore & Western.—$500,000 extension and improvement 5 per cent. sinking fund gold bonds.

Pittsburg, McKeesport & Youghiogheny—$350,000 stock, making the total amount listed $3,350,000.

Rome, Watertown & Ogdensburg Terminal.—$375,000 first mortgage 5 per cent. guaranteed gold bonds, and $130,000 first mortgage 5 per cent. gold bonds of the Norwood & Montreal road, guaranteed by the Rome, Watertown & Ogdensburg.

St. Paul, Minneapolis & Manitoba.—$801,000 additional consolidated mortgage bonds, 6 per cent. reduced to 4½ per cent., making the total listed $26,245,000.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Maine, semi-annual, 4 per cent., payable May 15.

New York, Providence & Boston, quarterly, 2½ per cent., payable May 10.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, Topeka, Kan., May 9.

Burlington, Cedar Rapids & Northern, annual meeting, Cedar Rapids, Iowa, May 28.

Canada Southern, annual meeting, June 5.

Chicago, Burlington & Quincy, annual meeting, Chicago, Ill., May 15.

Chicago & Northwestern, annual meeting, Chicago, Ill., June 6.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, Hudson, Wis., June 8.

Cincinnati, Indianapolis, St. Louis & Chicago, special meeting, Indianapolis, Ind., May 15, to consider the agreement for consolidation with the Cleveland, Columbus, Cincinati & Indianapolis, and the Indianapolis & St. Louis roads.

Cleveland, Columbus, Cincinnati & Indianapolis, special meeting, Cleveland, Ohio, May 15.

Hancock & Pennsylvania, special meeting, 16 Exchange Place, New York, May 18.

Louisville, Evansville & St. Louis, special meeting, Mr. Vernon, Ill., May 20.

Michigan Central, annual meeting, Detroit, Mich., May 2.

Middletown, Unionville & Water Gap, annual meeting, 15 Cortlandt street, New York, May 27.

Missouri, Kansas & Texas, annual meeting, Parsons, Kan., May 15.

New York & Harlem, annual meeting, Grand Central Depot, New York, May 21.

Pittsburgh, Fort Wayne & Chicago, annual meeting, Pittsburgh, Pa., May 15.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Master Mechanics' Association* will hold its next annual convention at Niagara Falls, beginning Tuesday, June 18, with headquarters at the International Hotel. All who wish to secure rooms should apply to Mr. A. H. Gluck, Manager, International Hotel, Niagara Falls, N. Y.

The *Master Car-Builders' Association* will hold its next annual convention at Saratoga Springs, N. Y., June 25. Hotel accomodations may be secured by applying to H. S. Clement, Manager Congress Hall.

The *Train Dispatchers' Association* will hold its second annual convention in Indianapolis, Ind., June 12. E. J Peabody, 237 Franklin street, Chicago, is Secretary.

The Association of American Railway Accounting Officers will hold its next meeting at Niagara Falls, N. Y., in July.

The American Society of Mechanical Engineers will hold its next annual meeting at Erie, Pa., May 14, 15 and 16.

The International Association of Car Accountants will hold its fourteenth annual meeting at Plank's Grand Hotel, Island of Mackinaw, Mich., June 25.

The Traveling Passenger Agents' Association will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The Roadmasters' Association of America will hold its seventh annual convention at Denver, Colo., Sept. 10.

The New England Roadmasters' Association will hold its next meeting in Boston, August 21.

The American Association of General Passenger and Ticket Agents will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The National Association of General Baggage Agents will hold its next meeting at Detroit, Mich., July 17.

The *National Association of Railway Surgeons* holds its annual convention in St Louis, Mo., May 2, 1889.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7.30 p. m. at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m. on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineers' Club of Philadelphia.

A regular meeting was held April 20, 1889. Vice-President Arthur Beardsley in the chair; 24 members present.

The Secretary presented, for Mr. Henry A. Vezin, an illustrated description of gallows frames in Colorado. Mr. Vezin says: You will receive six tracings. They are designs of gallows frames at mines near Leadville. The sketch for the iron frame was made, because the manager insisted on having an iron frame as a safeguard against fire. He did not seem to understand that the burning of the old frame was due to the burning of the shaft-house, that a wooden gallows frame cannot burn by itself, and that an iron frame would be destroyed should the shaft-house burn. The plan of using iron was abandoned when it was found that the iron frame would cost at least three times as much as the wooden one.

The gallows frames usually made in the West have heavy timbers resting on the collar of the shaft with comparatively light struts in the direction of the pull. They have many mortices and tenons, much cross-bracing and many points of vibrations. In these that I send the timbers are subjected to end thrust only, the tie rods to tension. There are no mortices and tenons, no nice work, much less timber is used, the posts and struts leave the collar of the shaft clear, and the frames are unusually stiff. The main struts or posts are placed in the line of the resultant of the pulls on the rope.

The Wright shaft gallows frame cost $65 for framing and erecting, at which price the men lost money. Wages were $4 and $5 per day for millwrights. Bids by men of better judgment were $136 to $150. I am under the impression that the whole frame cost $400, lumber being $22 per thousand. The original frame had 4 posts, 18 in. × 22 in., was framed like those of the Comstock mine, and cost $1,800. The timber then cost $35 per thousand.

Prof. H. W. Spangler described an instrument for summing up the lengths of lines, consisting of a pair of dividers with a registering device attached. He explained its use in determining the area of indicator cards, by dividing the card into vertical trapezoids of equal width, obtaining the aggregate of the average height of each with these dividers and multiplying by the width.

New England Railroad Club.

The next regular monthly meeting of the Club will be held on Wednesday, May 8, at 7.30 p. m. The subjects for discussion are: The Rules for Interchange of Freight Cars and The Desirability of Increasing the Size of Car Axles.

PERSONAL.

—Mr. John W. Cloud has accepted the Secretaryship of the Master Car-Builders' Association.

—Vice-President James A. Rumrill, of the Boston & Albany, has received an appointment as Judge at the Paris Exposition.

—Mr. Brayton Ives has tendered his resignation as Vice-President and director of the Oregon & Transcontinental Company. Mr. Ives still remains a director of the Northern Pacific.

—Mr. Charles H. Rockwell, General Passenger Agent of the Cincinnati, Hamilton & Dayton, has resigned to become Private Secretary to George M. Pullman, President of the Pullman Palace Car Co.

—Mr. T. S. Chapman, formerly Superintendent of Motive Power on the Chesapeake & Ohio, and late General Manager of the Safety Car Heating & Lighting Co., has been appointed Superintendent of Motive Power of the Central of Georgia.

—Mr. M. S. Parker, a well known Civil Engineer of the northwest, has severed his connection with the Sioux Falls, DeSmet & Northern road as its Chief engineer. He was the able assistant of E. J. Roberts, chief Engineer of Construction of the Montana extension of the St. Paul, Minneapolis & Manitoba in 1886 and 1887, locating about 500 miles of the line.

—Mr. William M. Clements, General Manager of the Baltimore & Ohio lines east of the Ohio River, has resigned and will be succeeded by J. T. Odell, recently General Superintendent of the Chesapeake & Ohio. Mr. Clements has held this position since April, 1887. He has been General Superintendent of the New York, Pennsylvania & Ohio, and was for nearly 10 years Master of Transportation on the Baltimore & Ohio.

—Mr. William M. Phillips, after a service of nearly 20 years with the Pennsylvania and its controlled lines, has resigned his position as Superintendent of the Lewistown Division of that road. He has held this position for nearly eight years, and has also been Engineer of Maintenance of Way on several divisions of the road. Robert L. Holliday, who has been with the Pennsylvania since 1876, and since August, 1883, as Superintendent of the Bedford division, has succeeded Mr. Phillips.

—The Hon. William H. Barnum died at his home at Lime Rock, Conn., at 9:45 A. M. April 30. He was born Sept. 17, 1818, and had made a great fortune and a national reputation. To the public he was best known as a politician, having been for some years Chairman of the Democratic National Committee, and having sat in the State Legislature of Connecticut, in Congress nine years, and in the United States Senate. His business relations were very wide. He was a railroad president and director and very largely interested in iron making and in car-wheel works.

ELECTIONS AND APPOINTMENTS.

Abbotsford & Northeastern.—The directors of this company are: Alfred A. Krouse, Max C. Krouse, Andrew M. Joys, Joseph E. Host and Lawrence W. Hosley, all of Milwaukee.

Alleghany & Kinzua.—C. D. Williams, Superintendent, has been appointed Auditor, with headquarters at Bradford, Pa., vice J. E. Rooney, who remains Treasurer, with office at Olean, N. Y.

Alton Terminal.—Delos R. Haynes has been elected President, H. A. Fisher Vice-President and General Manager, and L. C. Haynes Secretary and Treasurer, with office in Springfield, Ill.

Athens & Jefferson.—The incorporators of the road met in Athens, Ga., April 23, and elected officers for the ensuing term as follows: President, R. B. Russell; Secretary, R. L. Moss; Treasurer, John A. Hunnicutt· Directors, C. G. Talmadge, E. R. Hodgson, R. L. Moss, John A. Hunnicutt, G. H. Yancey and R. K. Reaves, of Athens; Elberton Askew, J. E. Randolph, J. L. Williamson and A. H. Brock, of Jefferson.

Birmingham, Sheffield & Tennessee River.—The stockholders of this company met April 18, at Sheffield, Ala., and elected the following directors: Alfred H. Parrish, W. Pearsall, N. Thouron, R. I. Simpson, and P. Campbell. The directors elected the following officers: Alfred Parrish, President; N. Thouron, Vice-President; W. Pearsall, Secretary and Treasurer; R. T. Simpson, General Counselor; P. Campbell, General Manager; Edward Marsh, Superintendent.

Brazos Terminal.—The officers are: W. M. D. Lee, of Leavenworth, Kan., President; Ira H. Evans, Austin, First Vice-President; G. Y. Wisner, Second Vice-President; John M. Ferguson, Secretary; George W. Angle, Treasurer.

Centralia & Altamont.—The following are the members of the first board of directors of this Illinois company, whose incorporation was noted last week: Lewis F. Casey, G. P. Duncan, A. Dunker, Jacob Grosch and B. Haussler, of Centralia, Ill. The first board of directors of this Illinois company is as follows: Lewis F. Casey, G. P. Duncan, A. Dunker, J. Grosch and B. H. Haussler, of Centralia, Ill.

Central Ohio.—The following board of directors were elected at the recent annual meeting: James H. Collins, Columbus; Walter B. Brooks, Joseph O. Jenkins, Joshua G. Harvey, Osman Latrobe, A. Craye, Baltimore; John B. Hall, Quaker City, Ohio; John Hoge, Zanesville; C. H. Kibler, Newark; Daniel C. List, Wheeling; David Lee, Zanesville, Gilbert G. Hoover, Columbus; W. W. Peabody, Cincinnati.

Chattaroi.—Clay Rockwell has been appointed Auditor and General Passenger and Ticket Agent, with office at Ashland, Ky.

Chesapeake & Ohio.—H. Frazier has been appointed Superintendent of Maintenance of Way, with headquarters at Cincinnati, Ohio.

J. W. Sherwood has been appointed Superintendent of Transportation of this road, and of the Richmond & Alleghany, with office at Cincinnati.

Chicago, Rock Island & Pacific.—S. F. Boyd, General Ticket and Passenger Agent of the Minneapolis & St. Louis, has been appointed General Passenger Agent of the whole Rock Island system for the district west of the Missouri River.

The company announces the following appointments: George H. Smith, Assistant General Ticket Agent, headquarters, Chicago; Geo. L. Rhodes, Assistant General Passenger Agent, headquarters, Chicago.

Chicago & West Michigan.—James E. Howard has been appointed Assistant Treasurer, vice Chas. L. Gunn, resigned. The office of the Assistant Treasurer and of the Auditor was removed from Muskegon, Mich., to Grand Rapids, Mich., May 1.

Chicago & West Michigan and Detroit, Lansing & Northern.—James F. Reekie has been appointed General Passenger and Ticket Agent of these companies, with headquarters at Detroit, Mich.

Cincinnati & Ohio River.—The incorporators are: E. C. Dawes, F. G. Cross, A. H. Mattox, C. B. Matthews and Charles M. Hepburn.

Cincinnati Southern.—H. F. Clark has been appointed Superintendent of the Cincinnati, New Orleans & Texas Pacific, with office at Somerset, Ky., vice W. W. Wells, deceased. W. W. Bond has been appointed Superintendent of the Vicksburg & Meridian and Vicksburg, Shreveport & Pacific roads, with office at Vicksburg, Miss., vice H. F. Clark, transferred.

Cleveland, Akron & Columbus.—G. M. Taylor, Master Mechanic, having resigned, John J. Henry, of Mt. Vernon, has been appointed his successor.

Confluence & State Line.—The directors of this Pennsylvania company are: J. Bayard Henry and Charles W. Henry, Germantown, Pa.; Joseph U. Crawford, Edward J. Aledo, Edward D. Ioland and James Strong, Philadelphia; and R. H. Morris, Bristol. J. Bayard Henry is President.

Decatur, Chesapeake & New Orleans.—The following compose the board of directors of the consolidated company: H. G. Bond and E. C. Gordon, of Alabama; G. W. Edwards, of New York; J. H. Holman, S. W. Rawls and G. W. Morgan, of Lincoln County, Tenn., and G. C. Sandusky, Joe D. Wilhoite and W. A. Frost, of Bedford County, Tenn.

Denver, Texas & Fort Worth.—F. E. Bissell, Chief Engineer, has been appointed Superintendent of the Central and Northern Divisions, with office in Denver, Col. He has been Acting Superintendent for some time.

Detroit, Lansing & Northern.—John K. V. Agnew has been appointed General Superintendent, vice Thomas M. Fish, resigned. The office of General Superintendent has been transferred from Ionia, Mich., to Grand Rapids, Mich.

U. B. Rogers has been appointed Auditor, with office at Grand Rapids, Mich.

The office of General Accountant has been abolished.

The office of Assistant Treasurer has been removed from Detroit, Mich., to Grand Rapids, Mich.

Dunklin County & Memphis.—The officers of this Missouri company are: G. W. Signor, President; J. L. Reinach Secretary; James M. Waltrin, Treasurer.

Fort Collins, North Park & Salt Lake City.—The incorporators of this Colorado company are: Isaac N. Van Dyke, of Paris, Ill.; Henry A. Craft, of Fort Collins, Col.: John H. Walsh, of Brooklyn, N. Y.; Abraham Lafever and John Lafever, of North Park, Col.

Fresno & Pine Ridge.—The officers are: J. P. Vincent, President; Thomas E. Hughes, Vice-President; and W. H. McKenzie, Secretary.

Great Eastern.—The officers of this company are: James Cooper, President; S. J. Simpson, Secretary, and C. N. Armstrong, General Manager, all of Montreal.

Idaho Central.—Edward Dickinson has been chosen President. He still retains his connection with the Union Pacific.

Kansas & Arkansas Valley.—The directors elected at the annual meeting are: Jay Gould, George J. Gould, Edwin Gould, Thomas Essex, L. H. Roots, George E. Dodge, R. S. Hynes, F. R. McKibben and W. H. H. Shibley.

Kansas City, Fort Scott & Gulf.—H. A. Johnson, formerly Assistant General Freight Agent of the Union Pacific, has been appointed General Freight Agent, with office in Kansas City, vice M. L. Sargent, promoted to be Traffic Manager.

Kansas City, Louisiana & Gulf.—The following have been elected officers: President, J. P. Pomerov; Vice-President, H. M. Jackson; Secretary, George W. Simonds; Treasurer, J. K. Fisher; Auditor, J. L. Bliss; General Manager and Chief Engineer, J. H. Dawson.

Kansas City & Pacific.—M. C. Lappin has been appointed Acting Auditor, with office in Parsons, Kan., vice F. C. Federer, deceased.

Knoxville, Cumberland Gap & Louisville.—Clarence Cary is President, W. G. Gahman is Vice-President and A. A. Arthur is General Manager, with office in Knoxville.

Knoxville Southern.—G. R. Eager is President and E. E. Malcolm is Secretary, both with office in Knoxville, Tenn.

Kokomo Belt.—J. C. Blackledge, of Kokomo, Ind., is President of this road; George P. Wood is Vice-President, and L. J. Kirkpatrick is Secretary and Treasurer.

Lake Shore & Michigan Southern.—The annual meeting of the stockholders of the company was held in Cleveland, Ohio, May 1. About $38,000,000 of stock was voted. The directors, whose term of three years had expired, were re-elected as follows: John Newell, Cleveland; Edwin D. Worcester, John E. Purrill, Frederick W. Vanderbilt, New York; John De Koven, Chicago.

Lexington Belt.—The officers of this Kentucky company are: Charles H. Stoll, President; John T. Shelby, Vice-President; J. S. Kellar, Secretary; R. P. Stoll, Treasurer; A. I. Totten, Chief Engineer.

Little Rock & Fort Smith.—The following were elected directors and officers at the annual meeting in Little Rock, Ark., April 26: George J. Gould, President; S. H. H. Clarke, Vice-President; A. H. Calef, Secretary and Treasurer; T. Essex, Assistant Secretary and Treasurer. Directors: Jay Gould, George J. Gould, Edwin Gould, George E. Dodge, B. S. Johnson, L. H. Roots, Thomas Essex, Walter H. Pemberton. The Little Rock Junction road also elected the above directors, with the exception of Jay Gould and W. H. Pemberton.

Louisville, Evansville & St. Louis.—F. C. Butze has been appointed Purchasing Agent of the road, with headquarters at Chicago.

Mexican Central.—Andrew Smith, having resigned his position as Superintendent of the First Division, from Mexico to Silao, S. O. Lewis has been appointed to succeed him, with headquarters at City of Mexico. M. S. McCay has been appointed Superintendent of the Third Division, from Calera to Jiminez, with headquarters at Jimulco, vice S. O. Lewis, transferred. C. T. McCotter has been appointed Superintendent of the Tampico Division in charge of the operating and construction departments from Tampico to end of track, with headquarters at Tampico. The office of Assistant Superintendent has been abolished. E. H Whorf has been appoined Assistant Manager, with headquarters at the City of Mexico.

At the annual meeting of the stockholders in Boston, May 1, the following directors were chosen: Oliver Ames, Isaac T. Burr, J. Edwards, Boston; Sebastian Cammacho, Mexico Levi Z. Leiter, Chicago; E. R. Morse, Albert W. Nickerson William Roche, Warren Sawyer, Alden Spear, J. H. White, Boston; Joseph Richardson, New York; E. W. Jackson, Mexico; A. R. Symon, London; George B. Wilbur, Boston, and Levi C. Wade and E. H. Hoff, Mexico.

Mexican National.—W. I. McCammon has been appointed Master Mechanic, with headquarters in the city of Mexico, vice J. M. Winslow.

Milwaukee & Northern.—Charles W. Cook has been appointed Assistant General Freight Agent.

Minneapolis & St. Louis.—C. H. Holdredge has been appointed General Passenger and Ticket Agent, with office in Minneapolis, to succeed S. F. Boyd, resigned.

Missouri, Kansas & Texas.—J. Waldo, Chairman of the late International Traffic Association, has been appointed General Traffic Manager of this road, with office at Sedalia, Mo.

M. Sweeney has been appointed Roadmaster, with headquarters at Greenville, Tex.

Mount Jewett, Kinzua & Riterville.—The directors chosen for first year are: Elisha K. Kane, Thomas L. Kane, Tom M. McClellan, Evan O'N. Kane, D. T. Hall, and J. D. Magowan, all of Kane, Pa. E. K. Kane is President

Mount Penn Gravity.—The directors are: President, John Rich, Reading, Pa.; S. E. Ancona, Charles Rich, B. F. Owen, Thos. P. Merritt, W. R. McIlvain, James Rich, Jesse G. Hawley, R. B. McKnight, F. S. Livingood, Dan'l H. Wingard, James Nolan, all of Reading, Pa.

Nashville & Knoxville.—The following directors were elected last week: A. Vandivort, W. Patterson, J. M. Hamilton, L. S. Hoyt, A. J. Crawford. Officers elected were as follows: A. J. Crawford, President; A. Vandivort, Vice-President; A. S. Crawford, Treasurer; J. A. Crawford, Secretary.

New York, Chicago & St. Louis.—At the annual meeting of the stockholders of the road, held in Cleveland, this week, the following directors were elected: William K. Vanderbilt, Cornelius Vanderbilt, Frederick W. Vanderbilt, Hamilton McK. Twombly, John S. Kennedy, James S. Roosevelt, Charles A. Reed, Daniel W. Caldwell, Jephtha H. Wade, Frank A. Mizener, Frederic P. Olcott, Chauncey M. Depew and Allyn Cox.

Norwich & Worcester.—M. M. Whittemore has been elected Treasurer, vice E. T. Clapp, resigned.

Ohio Valley Co.—A. E. Schrader has been appointed General Freight and Passenger Agent, with headquarters at Henderson, Ky.

Ohio & West Virginia Southern.—The incorporators are R. R. Dawes, T. W. Moore, W. M. Morse, J. H. Riley and W. H. Gurley, of Marietta; Thomas E. Davis, Charles S. Martin, S. B. McWherter, Job Musgrove and W. S. Hamilton, of West Virginia.

Pacific Short Line.—The officers are: D. McLean, General Manager; L. H. Clarke, Chief Engineer; F. C. Hills, Superintendent, and L. F. Wakefield, Assistant Chief Engineer. The principal office is in the Chamber of Commerce Building, Sioux City, Iowa.

Pennsylvania.—R. L. Holliday, Superintendent of the Bedford Division, has been transferred to the Lewistown Division with office at Lewiston, Pa., and W. Heyward Myers has been appointed Superintendent of the Bedford Division with office in Bedford, Pa., to date from May 1.

Peoples'.—The officers of this Kansas road are: L. C. Alexander, of Kansas City, President; F. G. Welch, of Williamsburg, Vice-President; T. Ormsby, of Topeka, Secretary, and C. Spaulding, of Topeka, Treasurer.

Petaluma & Sebastopol.—W. S. Palmer has been chosen Chief Engineer of this California road.

Richmond & Allegheny.—The title of T. J. Dabney has been changed from Superintendent of Transportation to that of Superintendent, and J. W. Sherwood has been appointed Superintendent of Transportation.

St. Joseph, St Louis & Santa Fe.—Edward Wilder having resigned as Treasurer of this company, D. L. Gallup has been elected to succeed him. C. S. Sutton, Rialto Building, Chicago, Ill., has been appointed Auditor, vice E. R. Francisco, resigned.

St. Louis, Arkansas & Texas.—At the annual meeting of the stockholders last week, the following directors were elected: S. W. Fordice, R. C. Kerens, W. M. Senter, S. A. Bemis, Edwin Gould, W. B. Doddridge, H. C. Haarstick and D. K. Ferguson. The directors elected the following officers: President, S. W. Fordyce; Vice-President, R. C. Kerens; Secretary, Edwin Gould; Auditor, D. Johnson; Treasurer, G. K. Warner; General Manager, W. B. Doddridge; General Freight and Passenger Agent, D. Miller; General Superintendent, H. G. Fleming; Purchasing Agent, F. W. Schuarte; Master Mechanic, E. S. Marshall.

St. Paul, Minneapolis & Manitoba.—Sir George Stephen and Sir Donald Smith were last week elected directors of the road.

Seattle, Lake Shore & Eastern.—John Craig has been appointed Auditor, with office at Seattle, W. T., vice F. A. Allen, resigned.

Sparta & St. Geneviere.—The following are the names of the first board of directors of this Illinois company: H. W. Schmidt, Thomas F. Alexander, D. F. Barker, W. D. M. Elker and J. E. Gaston, of Sparta, Ill. T. F. Alexander, Sparta, Ill., is President.

Staten Island Rapid Transit.—At the annual meeting of stockholders of this company, held in New York April 30, the following directors were elected for the ensuing year: Charles F. Mayer, Orland Smith, Thomas M. King, C. K. Lord, Frank S. Gannon, J. Frank Emmons, Erastus Wiman, A. B. Boardman, James M. Davis, C. Watrous, O. S. Wood, A. C. Rose, P. H. Marshall; Frank S. Gannon, General Superintendent.

Texas & Pacific.—Jay Gould has been chosen President, in place of John C. Brown, resigned.

Tonawanda Valley & Cuba.—Augustus Stein, of New York, has been appointed Receiver, to succeed Gen. B. W. Spencer, resigned.

Trans-Missouri Railway Association.—William Wilson Finley, General Freight Agent of the Denver, Texas & Gulf, has been appointed, and accepted the Chairmanship of the new Trans Missouri Railway Association. The headquarters of the Association will be at Kansas City.

Yankton, Norfolk & Southwestern.—The officers of this Dakota company are: J. H. Teller, of Yankton, President; Charles A. Hale, of London, Vice-President; F. C. D. Haggard, of London, Treasurer; J. F. M. Pierce, of Yankton, Secretary.

OLD AND NEW ROADS.

New Companies Organized.—Confluence & State Line.—Dunklin County & Memphis.—Fresno & Pine Ridge.—Mount Jewett, Kinzua & Ritesville.—Mount Penn Gravity.

Abbotsford & Northeastern.—This company has been organized to build a road from Abbotsford, a station on the Wisconsin Central to Black Creek Falls, in the county of Marathon, a distance of about 15 miles. The capital stock is $120,000.

Alabama Midland.—About 15 miles of the line between Troy and Ada, Ala., is now under contract, and work the remaining distance to Ada will be commenced as soon as the right of way has been secured. The line has been completed between Bainbridge, Ga., and Gordon, Ala. Work is now in progress between Newton and Ozark, and nearly completed to Newton. The grading between Brundidge, Ala., and Troy is finished, except two gaps near Brundidge. All of it will be completed by May 10. Between Brundidge and Ozark all is finished except two gaps and 3 miles near Pea River. Between Newton and Ozark the work to be done will require 60 days. Between Newton and Gordon the work will be finished by May 5. Tracklaying will soon be completed between Gordon and Newton, and if the work on the section between Newton and Ozark is not sufficiently advanced for tracklaying, the rails will be laid on the section from Ozark to Brundidge and Troy.

Atlantic City.—The stockholders and directors held meetings at Camden, N. J., last week, and confirmed the recent consolidation of the leased branches with the Philadelphia & Atlantic City road, which were merged under the corporate title of the Atlantic City Railroad. The issue of the following new stock and blanket mortgage bonds of the Atlantic City Railroad were also authorized, the old issues of the several consolidated lines to be retired. Preferred stock, $1,000,000; common stock, $1,200,000, and $2,200,000 5-per-cent. mortgage bonds.

Bellville, Centralia & Eastern.—The surveys for this connecting road have been nearly completed, and the contracts for constructing it will be let at an early day. The line will extend from Belleville to Mt. Vernon, Ill., about 60 miles, and when completed is to be a connecting link in a through line between St. Louis, Mo., and Louisville, Ky., under the name of the Louisville, Evansville & St. Louis Consolidated Railroad Co.

Birmingham Mineral.—A preliminary survey for a proposed extension from near the Bamberger mines to Tuscaloosa, Ala., has just been finished.

Burgaw & Jacksonville.—Surveys will be made at once by Walter G. McRae, of Wilmington, N. C., for this road, which is projected to extend from Burgaw to Jacksonville, N. C., about 28 miles.

Central of Georgia.—The company will shortly issue a consolidated five per cent. 40-year bond on the lines of the Savannah & Western, including the line now completed, and providing for future construction and the retirement of prior liens.

Cincinnati, Alabama & Atlantic.—J. B. Thompson, of Harrodsburg, Ky., and Mr. Mattingly, of Louisville, Ky., have contracts on the road. It is to be completed to Tullahoma, Tenn., 60 miles from Huntsville, Ala., by next March.

Cincinnati & Ohio River.—Articles of incorporation have been filed with the Secretary of State, of Ohio. Gallipolis and a point in Gallia County, O., on the Dayton, Ft. Wayne & Chicago, or a point on the Cincinnati, Washington & Baltimore, near Oak Hill, Jackson County, O, are to be the termini of the proposed line. The object of the road is to open up new coal fields in Jackson and Gallia counties. The capital stock is $100,000.

Cincinnati Southern.—The Solicitor of the City of Cincinnati has brought suit against the trustees of this company and against the lessees of the road, asking the court to declare the trust terminated, to transfer the title of the lease of the road to the city of Cincinnati, and to enjoin the trustees from extending the present lease, as provided in a recent act of the Ohio Legislature. The Solicitor takes the ground that since October, 1881, the trustees have been acting without authority of law, and asks that they account to the city for the money paid them by the lessees since that time as compensation and for expenses, amounting to $12,000 a year.

Columbus, Lima & Milwaukee.—The articles of consolidation of the Columbus, Federal Valley & Floodwood, the Columbus, Lima & Northwestern and the Columbus & Lake Michigan Railroad companies under the above name have been formally filed in the office of the Secretary of State of Ohio. The capital stock is placed at $10,000,000. The road is projected to extend from Floodwood to Saugatuck, Mich., about 364 miles, and of this the 125 miles between Columbus and Defiance, O., is under contract. This section of road has been permanently located, and preliminary surveys have been made on the entire line. B. C. Faurot is President, and R. P. Van Dusen is Chief Engineer. The office of the company is in Lima, O.

Confluence & State Line.—This company has filed a charter in Pennsylvania to construct a road from a point on the line of the Pittsburgh Division of the Baltimore & Ohio at or near Confluence, Somerset County, Pa., to a point on the line of the Youghiogheny River where it enters the state of Maryland, the line running along the Youghiogheny River from Confluence to the Maryland line. The length of the road is about 10 miles and the capital stock is $100,000.

Covington & Macon.—R. T. Martin & Co., of Chattanooga, Tenn., have the contract for grading and trestling on the branch from Machen west to Griffin, Ga., a distance of about 50 miles.

Decatur, Chesapeake & New Orleans.—The Tennessee and Alabama divisions have been consolidated. A sub-contract has been awarded for seven miles, extending from a point three miles south of Fayetteville to a point on the line four miles north of the town, and other contracts will be let soon. Bids will be received for the remaining 23 miles in Lincoln County, work to be commenced at once. It is expected that the 30 miles from Decatur to the Tennessee state line, and the 16 miles from the west line of Lincoln County to Shelbyville, which is heavy work, will be put under contract in the next 30 days. G. W. Edwards, with headquarters at Favetteville, Tenn., is Chief Engineer.

Delaware.—The bills incorporating the Citizens', the Harrington & Breakwater and the Georgetown, Milton & Breakwater Railroad Companies have all failed to pass the House of Representatives.

Denver, South Park & Pacific.—Two suits amounting to nearly $2,000,000, recently filed for foreclosure and the appointment of a receiver, have been consolidated into one. The suits are those of the Central Trust Co., of New York, and of the Farmers' Loan & Trust Co., of New York.

Dunklin County & Memphis.—Articles of incorporation filed in Missouri to construct a standard gauge road from Malden, Dunklin Co., Mo., southerly to Memphis, Tenn. It is stated that work will be begun by the early part of June, and that a section will be opened next fall.

Evansville & Richmond.—Nearly 3,000 men are reported at work on the line, and it is expected to have the road completed between Elnora and Seymour, Ind., 65 miles, by Aug. 1, and to Richmond, 70 miles further, by Jan. 1 next.

Florida Central & Peninsular.—Circulars have been issued giving notice that the purchasers of the property of the Florida Railway & Navigation Co. have organized as a company under the name of Florida Central & Peninsular Railroad, which company assumed possession of the property May 1, with H. R. Duval as President.

This action is in obedience to decrees entered in the United States Circuit Court, for the Northern and Southern Districts of Florida, in the cases of the Central Trust Co., of New York, Trustee, the Guarantee Trust & Safe Deposit Co., Trustee, and Louis H. Meyer, George T. M. Davis, M. Bayard Brown, Trustees, against the Florida Railway & Navigation Co.

Fort Collins, North Park & Salt Lake City.—Chartered in Denver to build a railroad from Fort Collins west through Muddy Pass, Buffalo Pass, to the western boundary of Colorado, thence to Salt Lake City. Also branches to Livermore, and to Manhattan in Colorado, and lines from Fort Collins to Cheyenne and to Middle Park. The capital stock is placed at $200,000.

Fresno & Pine Ridge.—Chartered in California, with a capital stock of $600,000 to build a railroad from Fresno, about 52 miles to the timber lands.

Grand Trunk.—The Canadian Government has refused to give the company equal running rights with the Canadian Pacific over the new line about to be built between Harvey and Salisbury, N. B. It is said, however, that the company is negotiating with various lines in New Brunswick, by which it hopes to reach the Atlantic Coast in Canada by building connecting links.

Great Eastern.—Tracklaying will probably commence in May on that part of the road between St. Thomas, in Yamaska County, Que., and St. Gregoire, in Nicolet County, a distance of 21 miles. The contracts will probably be let this month for building that part of the line from St. Gregoire to the terminus of the Inter-colonial road at Chandler Junction, nearly opposite Quebec. The line when completed will be 144 miles long. C. N. Armstrong, 17 Place D'Armes Hill, Montreal, is the contractor for that part of the line now under contract, and he will probably be awarded the contract for the rest of the line.

Houston & Texas Central.—Three suits have been filed against this company, aggregating $2,704,575, in the District Court of Dallas County, Texas. The plaintiffs are the Lackawanna Coal & Iron Co., of Scranton, Pa.; the Southern Development Co., of San Francisco, and Morgan's Louisiana & Texas Railroad and Steamship Co. The suits are for judgment, with interest, on notes held by the plaintiffs.

Kansas City, Louisiana & Gulf.—The locating survey is being made for this road, which is to be built from Lake Charles, La., to Alexandria, La., with several branches. The preliminary survey is finished.

Kansas City, Rich Hill & Eldorado.—The first survey from West Eldorado to Rich Hill, Mo., has been completed and work has been commenced on the division from Eldorado to Walker station, on the Missouri, Kansas & Texas.

Lackawanna & Pittsburgh.—Referee Rockwell, at Angelica, N. Y., last week sold the road to the highest bidder, a committee of the old stockholders. The highest bid was $25,000, which was subject to the debts of the road as shown by the receiver. The new purchasers claim that all debts of the road will be paid and that it will be reopened at once, also that great improvements will be made.

Lexington Belt.—Contracts will probably be let about June 1. The preliminary surveys have been nearly finished, and the location will also be soon completed. The line will be located in and near the city of Lexington, Ky., for the purpose of connecting in the suburbs of the town, the six railroads now centering there; and on the line of the Belt road will be constructed a union passenger depot. It will be built during this spring and summer.

Complete arrangements have been made for money to construct the road, and the right of way has been practically settled. Along the line of the road a land company organized in connection with the railroad company has purchased large tracts of land to be set apart for manufactories and other similar purposes. The completion of the Kentucky Union and the Louisville Southern roads to Lexington will make the place an important railroad centre. It is this which its projectors think makes the belt line a necessity and guarantees its success.

Louisville, Hardinsburg & Western.—This company last week executed to the American Loan & Trust Company a mortgage for $630,000. It is thought that work will at once begin on the road.

Macon & Birmingham.—The engineers have now completed over 20 miles of the preliminary survey northwest from Macon and will soon reach Culloden on the Atlanta & Florida. The survey will be run through the towns of Thomaston, Greenville and La Grange in Georgia. Active construction work will be commenced Oct. 1 by the Macon Construction Co., which company, as already stated, has the contract for building the line. W. Henry Wells, of Macon, is Chief Engineer.

Marion Belt & Chingawassa Springs.—The contract has been let for building this road, which is to be eight miles long, extending from Marion, Kan., to Chingawassa Springs. John Hall, of Fort Ann, N. Y., is President, and O. C. Leseur, of Marion, Kan., is Chief Engineer.

Monongahela River.—The Parkersburg Construction Co., of Parkersburg, W. Va., has let the contract for grading this road to Ryan & McDonald, of New York, sections 4 to 15; T. J. Steer & Co., Parkersburg, W. Va., sections 16 to 21; Stanley & Co., of Ohio, sections 22 to 31; F. Blodgett & Co., Parkersburg, section 3 and the river bridge. Sections 1 and 2 embrace the Gaston Railway, already in operation. Work under the contracts is to begin at once. J. A. Sturm & Co., of Ohio, were awarded the contract for all the first-class masonry.

Mount Jewett, Kinzua & Riterville.—This company has been granted a charter in Pennsylvania to build a road eight miles long in McKean County, from points of junction with the Big Level & Kinzua and other railroads at Mount Jewett to a point of junction with the New York, Lake Erie & Western near Crawford's Summit. The capital stock is $80,000.

Mount Penn Gravity.—Chartered in Pennsylvania to build a road from a point in the city of Reading along and around Penn's Mount and Dengler's Hill, in Alsace township, and along the eastern slope of that hill and Penn's Mountain, and across Penn's Mountain, between McKnight's Gap and the Black Spot, to the western slope of Penn's Mountain, and along that to the starting point, a distance of about 8 miles. The length of the road will be about 8¼ miles and the capital stock is $100,000.

New Birmingham & Northwestern.—Chartered to build a road from New Birmingham, Tex., northwesterly to a point on the International & Great Northern road.

New York, Ontario & Western.—A meeting of stockholders of the Hancock & Pennsylvania will be held in New York May 18, for the purpose of voting upon an agreement for the consolidation of the Hancock & Pennsylvania road, the Forest City & State Line and the Scranton & Forest City road, which will be submitted to the stockholders of that meeting for their approval. These companies were chartered to build the extension from Hancock into the coal fields at Scranton. The survey for the extension is about completed, and contracts will be let soon for constructing the line.

Northern Pacific.—At a special meeting of the directors in New York last week, the resolution agreeing to the arbitration contract for the control and harmonious operation of the roads in the Pacific Northwest was rescinded. This ends the proposal to obtain a guarantee of the dividend on the Oregon Railway & Navigation stock from the Northern Pacific jointly with the Union Pacific, and throws the burden of the lease on the Union Pacific.

Ohio & West Virginia Southern.—The company has been organized in Ohio to build a road from Marietta across the counties of Wood, Pleasants, Ritchie, Gilmer, Braxton, Webster and Pocahontas, West Virginia, passing through the timber and coal districts of that State, to connect with the roads to the seaboard.

Ouachita, Union & Northwestern.—This is the name of the company organized to build the road from Monroe to Farmerville, La., and thence to Camden, Ark., mentioned in our issue of April 19, under the title of Union & Northwestern.

Pacific Short Line.—E. P. Reynolds & Co., who have established offices at Sioux City, Ia., and who have the contract on the Nebraska & Western for the first 100 miles west from Sioux City to a connection with the Fremont, Elkhorn & Missouri Valley, have let a sub-contract to Kimball & McNamara for 11 miles, and to McLean & Brooks for the next 20 miles.

Pennsylvania.—Engineers last week began making surveys for the proposed new railroad between Brown's Mills and New Lisbon, N. J.

Penobscot Central.—The directors have voted to lease all the franchises, properties, etc., of the company to the Castine & Bangor for 999 years. This will give a line when completed from Bangor up the Kenduskeag Valley through Corinth and Milo, thence to Brownville, crossing the Canadian Pacific road.

Peoples'.—Incorporated in Kansas to build a railroad from a point near Garnett, in Anderson County, northwest through Franklin County to the coal fields of Williamsburg, and thence to Topeka. The line will be about 125 miles long, and some surveying has been done.

Pittsburgh & Lake Erie.—A mortgage for $4,000,000 is being recorded in Ohio. It is to secure an issue of bonds of a like amount, recently authorized by the stockholders.

Port Townsend Southern.—Payne Bros., of Port Townsend, W. T., have commenced work on the first six miles of the road. The contract for an additional 20 miles will be let as soon as the survey is finished. The surveyors are now working on the preliminary survey in Chehalis County, near the Columbia River. A permanent survey has been completed to Quilcene Bay and right of way is now being secured. J. R. Hoag, of Port Townsend, is Chief Engineer.

San Diego & Eastern Terminal.—The contract for the first 4½ miles of the road has been awarded to E. C. Burlingame, of Los Angeles. The contract provides that work must be commenced in ten days. The projectors of the road have also formed a company for the purpose of building from San Diego to Yuma, and from San Diego to Los Angeles.

Sandusky, Columbus, Lake Erie & Southern.—This company, whose incorporation was referred to last week, proposes to build a road from Sandusky, O., southerly through the counties of Erie, Huron, Seneca, Crawford, Marion, Morrow, Delaware and Franklin to Columbus.

Santa Ana.—Organized in California to build a railroad from Santa Ana to the ocean at Newport Beach, its length to be 10 miles. Of the capital stock $10,000 has been subscribed.

Savannah & Oconee.—Horace P. Smartt, D. C. Bacon and M. F. Armstrong have incorporated the company to build a railroad from Savannah to the Oconee River, about 100 miles.

Schuylkill & Lehigh Valley.—Thirteen miles of the heaviest work on this road is now under contract to Brodhead & Hickey, Thomas H. Rickert, Kerns & Bissell and Gaynor, Lee & Gaynor. The right of way and other property of the road have been formally transferred to the Lehigh Valley. The road will extend from a point near Bowman's Station, known as Lehigh Junction, to a point at or near the village of Tremont, about 50 miles, and through the towns of Minersville, Orwigsburg, Pottsville, Cressona and Schuylkill Haven. Eaton N. Frisbie, of 1 Broadway, New York, is President, and Charles E. Webster is Chief Engineer, with office at Schuylkill Haven, Pa.

Sioux Falls & Pacific Short Line.—Organized in Dakota to construct a road to run northwesterly from Sioux Falls to Forest City, or some point on the Missouri River.

South Mountain.—It is announced that the controlling interest in this road is now held by the parties who control the Pennsylvania, Poughkeepsie & Boston, and that the road will be completed from the Lehigh River to Harrisburg, Pa.

Suncook Valley.—George S. Theobald, Daniel Hazleton and D. K. Abbott, of Concord, N. H., and S. S. Ordway, of Suncook, N. H., have the contract for building the extension from Pittsfield to Barnstead Centre. This extension is to be continued to Alton Bay.

Union Pacific.—The extension of the Salt Lake & Western to Eureka, Utah, is expected to be completed by June 10. S. Bamberger, of Salt Lake City, has the contract. The grading is now in progress. The object of the branch is to give direct rail communication to the silver mines at Eureka, which are developing rapidly, and bidding fair to become the most important in Utah.

Wabash.—The purchasing committee has decided to issue enough new bonds to pay off dissenting bondholders and carry out the original purpose of the reorganization plan. The amount of new bonds to be issued has not been definitely decided upon, but it is estimated at between $5,000,000 and $6,000,000.

Western Counties.—Campbell & O'Neal have received the contract for building the 18 miles from Digby to Annapolis, Nova Scotia, which will give a continuous line from Halifax to Yarmouth.

Western Maryland.—The extension of the Baltimore & Harrisburg from Ortanna, west of Gettysburg, Pa., south to Blue Ridge Summit, Md., near the state line, will be opened for traffic May 20. As already stated, the greater part of this line runs over a route laid out by the late Thaddeus Stevens, and the grading on this line is said to have been among the first work of the kind ever done in the United States, although on account of its many curves it was subsequently abandoned.

Wyandotte & Quindaro.—Organized at Kansas City, Kan., with a capital stock of $60,000, by the following directors: J. W. Green, of Lawrence; W. P. Hogarty, of Quindaro; James Paddock, of Leavenworth, and N. J. Stephens and S. J. Hatch, of Kansas City, Mo.

Yankton, Norfolk & Southwestern.—All the right of way between Yankton, Dak., and Norfolk, Neb., about 60 miles, has been secured, and the locating survey is now in progress. It is asserted that sufficient funds have been secured to insure the building of the road this year.

TRAFFIC.

Traffic Notes.

The Southern Passenger Association has withdrawn all party rates, both state and inter-state. The order seems to apply only to one-way tickets.

The Pennsylvania has reduced the first-class unlimited fare between Pittsburgh and New York City to $10.50, a reduction of $2. A proportionate reduction has been made between Philadelphia and Pittsburgh. This action is reported to be a result of the competition of the Baltimore & Ohio.

A Baltimore dispatch states that dealers in dressed beef in that city will ask the Inter-state Commerce Commission to investigate the dealings of the Baltimore & Ohio with the large shippers of that commodity at Chicago. It seems to be acknowledged that the road has made contracts with Armour, Swift and Hammond to carry their dressed beef to New York at 45 cents, with the usual differential to Philadelphia and Baltimore, for a period of five years.

Chicago dispatches state that the Chicago, Milwaukee & St. Paul and the Chicago & Northwestern have manipulated rates on coal and coke from the East destined to Omaha, in favor of certain shippers, in such a way that the price from the mines to destination is reduced 35 cents a ton. It is alleged that this has been done by changing the destination at Chicago.

The St. Paul & Duluth has given notice that on May 10 it will reduce the rate on flour and mill stuffs from Minneapolis to Duluth from 7¼ to 5 cents.